Engaging with Others' Ideas:
A Study of Discussions Across Subject Areas in a 5th Grade Classroom

by

Peter McCormick Cipparone

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Doctoral Committee:

Associate Professor Chauncey B. Monte-Sano, Chair
Professor Deborah Loewenberg Ball
Professor Hyman Bass
Clinical Professor Cathy Hindman Reischl

Peter Cipparone

pcipparo@umich.edu

ORCID iD: 0000-0002-5016-0016

DEDICATION

To my students and fellow teachers, from whom I have learned so much, and for whom I serve.

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ABSTRACT

Research in U.S. elementary school classrooms suggests that discussion with peers is associated with positive student outcomes in multiple content areas, while scholars of democratic education claim that engaging in discourse where differing points of view are presented can help students develop as citizens. However, scholarly literature has not yet connected these two disparate areas of scholarship in empirical research on classroom discourse. In this case study, I examine how fifth-grade students engage with one another's ideas across the school day over the course of a month in a classroom where the teacher provides frequent opportunities for discussion. Specifically, I ask how the students in this classroom engaged with one another's ideas in literacy, math, and social studies; the power and authority differences apparent in these interactions; how students do this differently in different subject areas; and how the classroom teacher supports students in doing this work. Data for this study includes field notes of classroom instruction and talk, audio recordings of small and whole group conversations, student work, classroom artifacts, and interviews. Findings indicate that students in the classroom engaged with others' ideas by responding directly to others' ideas or indirectly referring to others' ideas in a variety of ways in both literacy and mathematics, though the way students engaged with others' ideas differed by subject matter. These differences included what students engaged with others' ideas about, the extent to which students discussed single ideas or many ideas, and the ways in which students engaged with others' ideas. Students' engagement with others' ideas also provided students with further opportunities to learn by bringing significant subject-matter content into the discussions. Importantly, however, evidence suggests that students' classroom

status and authority may have affected how they engaged with others' ideas. Finally, the classroom teacher supported students' engagement with others' ideas by creating an environment conducive to making sense of academic content, tending to how students related to one another, holding particular understandings and beliefs about the content she taught, and making specific moves during classroom discussions. This study contributes to the development of theory about how students interact with one another's ideas in multiple school subjects and how one teacher supports such work.

CHAPTER I

Introduction

It's just before 9:00 in Ms. Kanzer's 5th grade classroom, and students are gathered at the rug discussing which of two fractions is larger – 7/8 or 5/6. Vince was the first student called up to the white board to explain his thinking about the problem. He stood in front of the class and pointed to a bar model of the two fractions.

"So, eighths are smaller than sixths, and because there are more eighths, it has to be closer to one, so 7/8 is bigger." As Vince paused, students looked at one another. "What?" said Tim. "I don't really get what you're saying," said Amariah.

Ms. Kanzer stepped in. "It's okay if you don't understand something," she told the class. "Just ask Vince a question."

Alonso raised his hand. "So you're saying that 1/6 is bigger than 1/8 right?" Vince nodded affirmatively. "So, what does all that mean then?" Rebecca added. "Like, is there something you're trying to tell us about fractions?"

Ms. Kanzer turned back to Vince. "I think what Rebecca's looking for is a theory," Ms. Kanzer explained. "Like, what are you saying about fractions in general?"

Vince looked back at the board. "So, if one denominator is bigger than the other, it means there are more pieces, and the pieces are smaller. And in this case, both of the numerators are one away from the denominator. So, then the number with the higher denominator is going to be closer to a whole."

"Oh, oh I think I get it now," called out Alonso. "Can I try to explain Vince's idea to other people?" Ms. Kanzer nodded. After Alonso had paraphrased Vince's theory, Ms. Kanzer pushed to see if more of the class could do the same. "We should all be able to explain what each otheris thinking," Ms. Kanzer said. "Can one more person explain what Vince and Alonso are discovering?" Hannah did so, and Ms. Kanzer smiled. The conversation moved in other directions as students explained how they'd solved each other's work, but a few moments later Bobby referenced Vince's theory. "I'm saying something kind of like what Vince was saying," he explained. "I didn't get what he said at first, but now I do – it's like if a fraction has smaller pieces, it still might be larger if there are more of those pieces."

Researchers and practitioners might highlight a variety of elements of this discussion. Some might analyze the quality of Vince's explanations. Others might discuss how Ms. Kanzer interpreted a student comment as a push for generalization, and then proposed that Vince create a "theory." The most relevant aspect of this discussion to my study was how students seemed to engage with their peers' ideas. Tim and Rebecca expressed genuine confusion and then curiosity about Vince's initial idea, pushing him to be more precise. Alonso volunteered to rephrase Vince's idea after he understood it. Bobby referenced Vince's theory later in the discussion. On a broader level, students in this discussion seemed to listen to one another's ideas, take them into account, and incorporate them into their thinking. It is plausible that if students interacted in these ways regularly – in multiple subject areas, and over the course of the school year – they might eventually become citizens who are capable of interacting with diverse ideas in their everyday lives.

In this study, I investigate the phenomenon of engaging with others' ideas. Taking the lens that engaging with others' ideas is an important aspect of argumentation in mathematics, literacy,

and social studies, I explore how students in Ms. Kanzer's classroom engaged with others' ideas in each of these subject areas, what opportunities to learn students in this classroom had as a result of engaging with others' ideas, and how Ms. Kanzer supported students in engaging with others' ideas.

Both personal and scholarly considerations motivate my interest in engaging with others' ideas. As a fourth-grade teacher in the New York City public schools, I regularly held classroom discussions in each of the subject areas that I taught. Not all of the discussions I staged were successful, but in discussions that seemed to provoke student engagement and learning, students spoke to one another about their ideas by contesting claims, asking for evidence, and referencing each other's work. During one discussion of paintings that provided contrasting images of the American colonies, Isabella asked in a moment of frustration, "Well, then how can we really know anything about history?" This question remained on my social studies board throughout the year, and students referenced it over and over. I became convinced that students learned from their exchanges with one another over academic content.

As a scholar, I have learned that literature on classroom discussion in mathematics (Chapin & O'Connor, 2007; NCTM, 2015), literacy (Murphy et al., 2009; Soter, 2010), and social studies (Reisman, 2012b) suggests that discussion can have positive outcomes for learning in multiple subject areas. At the same time, scholars in democratic education suggest that classroom discussion can have positive outcomes for citizenship development. These scholars suggest that schools have the potential to be public spaces where young people can learn to hear, understand, and value ideas of diverse peers (Englund 2015, 2016; Parker & Hess, 2001) Although I do not investigate the civic outcomes of engaging with others' ideas, the possibility

of teaching subject area content in ways that forward both academic and civic goals is a motivator for this study.

In my research, I focus on engaging with others' ideas because I see it as a way to investigate a practice that may advance both the civic and academic purposes of schooling. I view engaging with others' ideas as a crucial sub-practice of developing argumentation skills, while for teachers I view supporting students' engagement with others' ideas as a sub-practice of facilitating discussion. I explore engaging with others' ideas out of a desire to add to nascent research on this phenomenon, and fill multiple gaps in the scholarly literature on engaging with others' ideas. First, scholars have not yet connected research on the democratic and academic purposes of classroom discussion and engaging with others' ideas; I frame my research with these two lenses from the outset. Second, I study engaging with others' ideas in multiple school subjects, and compare the differences and similarities in how students engage with others' ideas in these school subjects. Third, I extend the existing literature by attending to issues of power in how students engage with others' ideas by closely examining discussions where students may have had unequal levels of authority. Finally, I study both the opportunities to learn that students had as a result of engaging with others' ideas, and how a teacher worked to support students in engaging with others' ideas. In sum, this dissertation furthers research about an element of classroom discussion that may be at the crux of the classroom discussion's potential to spur democratic and subject matter learning.

Defining Terms

There are a number of terms I use in my research that are important to define before proceeding further (see Table 1). I also define the school subjects in which I conduct my research. Although I provide a concise definition of "engaging with others' ideas" in

this table, I further conceptualize this term below because of its importance to my research questions.

Defining "Engaging with others' ideas." Whenever possible, I use the terms *engage*, a verb, or *engaging*, a gerund. I do so in order to retain the sense of doing and action that implies that students actively participate in their lives and learning. By contrast, I avoid the term *engagement* whenever possible, as it implies less activity on the part of the student.

I recognize that *engaging* might not always involve talk. I see engaging as a broad set of communication practices, including listening and non-verbal gestures. For the purposes of this study and because of the data collection methods I relied upon, I largely look at how students engage verbally with others' ideas.

In previous drafts of my dissertation, I used "engaging *in* others' ideas" interchangeably with "engaging *with* others' ideas." I now exclusively use "engaging *with* others ideas." I make this choice out of a desire to cohere with the emerging body of literature on this concept that uses engaging *with* others' ideas. The use of *with* also matches my conception of teaching and learning as shared and constructed between students, the teacher, and the content at hand.

I define "*others' ideas"* as student comments about subject matter content. In my research, I studied teaching and learning that happened in the subject matters of math, literacy, and social studies, although social studies was not taught during data collection. For example, students' ideas about subject matter content could consist of ideas about characters in a whole class text, strategies for solving a math problem, or reasoning about what evidence might best support a claim when writing a literary essay.

Table 1. *Glossary of key terms used throughout this study.*

Term	Definition	Related Literature

Argumentation	The process of both a) constructing explanations that meet disciplinary standards, and b) understanding and interpreting the explanations posed by others. Engaging in others' ideas is a sub-practice of argumentation.	van Drie & van Boxtel, 2007; Yackel & Cobb, 1996
Citizenship Practices	Knowledge, skills, and practices associated with participating in a democracy and advocating for justice, including communicative competence and political efficacy. I posit that engaging with others' ideas is both one of many citizenship practices and a means of learning citizenship practices listed above.	Andersson, 2014; Westheimer & Kahne, 2004
Classroom Discourse	The exchange of ideas or information between and among teacher and students. Discourse may be verbal or written, and involve brief or extended exchanges of ideas.	McCrone, 2005
Disciplinary Practices	Ways of thinking and working that are important to learning, constructing new knowledge, and developing and testing claims, in a given discipline or content area.	Boaler, 2001; C3 Framework for Social Studies State Standards, NCSS, 2013; Lee, 2005; NGO & CCSSO, 2010; Wineburg, 1991
Discussion	Classroom discourse where students build upon one another's ideas that lasts at least two minutes.	Michaels, S., O'Connor, C., & Resnick, L. B., 2007; TeachingWorks, 2012.
Engaging with Others' Ideas	Classroom talk in which students respond or refer to others' ideas about subject matter content. Classroom examples include explaining another student's strategy for comparing fractions or making a suggestion to another student about what evidence might support a peer's prediction about what will happen next in a book the class is reading together.	Franke et al., 2015; Webb et al., 2014

Episode	Classroom talk about one topic that lasts at least 5 turns of talk.	Schleppenbach et al. 2007, Schoenfeld, 2013
Literacy	A K-5 school subject that includes developing the ability to read, write, speak, listen, and use language.	Bakhtin, 1981; Chinn, Anderson & Waggoner, 2001; NGO & CCSSO, 2010; Nystrand, 2006
Mathematics	A K-12 school subject that includes the study of quantity, shape, and change.	NGO & CCSSO, 2010; Schmidt & Houang, 2012; Schmidt & Prawat, 2006
Social Studies	A K-12 school subject encompassing the disciplines of history, civics, economics, and geography.	Brophy, Allen, & Halvorsen, 2016; Croddy & Levine, 2014; National Council for the Social Studies (NCSS), 2013
Socially-constructed authority	Differences in academic and social power resulting from the ways in which students position themselves in relation to one another.	Langer-Osuna, 2016; Davies & Herre, 1990
Subject-matter content	Topics, disciplinary practices, and ideas about the disciplines that students might learn about through the study of mathematics, literacy, or social studies.	NGO & CCSSO, 2010; NCSS , 2013
Opportunity to learn	An interactional phenomenon in which the learner has the opportunity to make sense of content, modify their existing knowledge, or develop new practices.	Tuyay, Jennings, & Dixon, 1995

In Chapter II of this dissertation, I review research on student learning and teaching methods that relate to my conception of engaging with others' ideas. In the section on student learning, I argue that engaging with others' ideas is a sub-practice of the disciplinary practice of argumentation and review research on argumentation in the disciplines of math, literacy and

social studies. I also review research on student learning as it relates to engaging with others' ideas, and how issues of status and authority may affect students when engaging with others' ideas. While reviewing research on teaching methods, I put an emphasis on research about facilitating classroom discussion, as I see helping students engage with others' ideas as part of facilitating a productive discussion.

In Chapter III, I outline the research methods that I used to conduct my research on engaging with others' ideas. In this section I describe the school context for this study and the data collection and analysis methods I used to structure my research.

In Chapters IV, V, and VI, I outline the findings for this study. Similar to my literature review chapter, I structure these chapters by focusing on how the students in the classroom engaged with others' ideas (Chapter IV), how status and authority influenced how students engaged with others' ideas (Chapter V), and how Ms. Kanzer facilitated this work (Chapter VI).

In the discussion section (Chapter VII), I put my findings in conversation with literature on engaging with others' ideas that I reviewed in Chapter II. Finally, in Chapter VIII I detail implications of this study for both practice and research.

CHAPTER II

Literature Review and Conceptual Framework

In this literature review, I first present a brief review of literature pertaining to the relationship between engaging with others' ideas and student learning, starting with the relationship between engaging with others' ideas and citizenship development. Even though this study does not explore the link between engaging with others' ideas and citizenship expertise, I open with this focus because citizenship development is a primary motivator for my research. I proceed to review the literature that shows the importance of argumentation in mathematics, literacy, and social studies. I see engaging with others' ideas as an important sub-practice of argumentation, and argumentation as a key disciplinary practice embedded in mathematics, literacy, and social studies. As follows, I argue that learning to engage with others' ideas is a key aspect of learning in each of these subject areas. Next, I review research that connects engaging with others' ideas to student learning in mathematics, literacy, and social studies. I close my review of student learning and engaging with others' ideas by examining research on how relationships of status and authority may affect how students engage with others' ideas.

In the second section of this literature review, I examine the scholarly literature on the teaching work involved in facilitating classroom discussion and ways of facilitating discussion that catalyze students' engagement with others' ideas. Finally, I close this literature review by describing absences in the literature that are addressed by this study, and the conceptual frame for my research.

Student Learning and Engaging with Others' Ideas

Engaging with Others' Ideas and Citizenship Development

Below, I present research that suggests a positive relationship between engaging with others' ideas and citizenship development. Although citizenship is not an outcome that I will assess during this study, I begin with this subsection because citizenship development is a primary motivator for this study.

Political theory and deliberative democracy. Research derived from political theorists suggests that engaging with others' ideas is an important aim of education for citizenship. Shreiner (2009) studied texts written by canonical political theorists in order to understand their ideas about "democratic thinking," or the thought processes necessary for democratic citizenship. She found that four salient features of their democratic thinking included a) democratic concepts such as justice and liberalism, b) formative knowledge such as the role of government, c) public reasoning, and d) deliberative decision-making. Of these four salient features of democratic thinking, the final two are closely related to engaging in others' ideas. Shreiner identifies "considering one's own *and* competing, yet reasonable, points of view" as the first of three aspects of public reasoning as sketched by her focal political theorists (2009, p. 142). She quotes Young (2000) as saying that public reasoning consists of listening to others, and interaction among participants who hold each other accountable. In the sphere of deliberative decision-making, Shreiner cites Gutmann (1987) as saying that student will need to learn to "consider the relevant alternatives" (p.51) before making a decision, and Young (2000) in saying that participants in democracy must "determine which proposals the collective agrees are supported by the best reasons" (p. 23). Taken together, Shreiner's (2014) synthesis of these political

theorists' writing suggests that public reasoning and deliberative decision-making is an important part of democratic thinking. I see engaging with others' ideas as practice that is essential to doing both of these forms of democratic thinking because both public reasoning and deliberative decision-making involve listening to, considering, and responding to a diverse set of ideas and perspectives.

Political theorists have compiled a particularly large set of literature on deliberative democracy, a topic closely related to deliberative decision-making and engagement with others' ideas. Gutmann and Thompson (1996) emphasized the need to support citizens' deliberative capacity, and argued that schools "should aim to develop their students' capacities to understand different perspectives, communicate their understandings to other people, and engage in the give-and-take of moral argument with a view to making morally acceptable decisions" (p.357). The work of Habermas (1984, 1987) also played a key role in the effort to articulate the type of communication between citizens that might be required to support deliberative democracy and communicative action. Englund (2006; 2015) relied on Habermas and Dewey to argue for teaching through deliberative communication -- or communication where different views are confronted and considered. In turn, extant research suggests that deliberative teaching could influence students' democratic virtues (Anderson, 2014). As Rosenberg (2005) points out in an article setting an agenda for research on deliberative democracy, this large body of literature depends on "a very specific psychology of the citizen participant and a complementary social psychology of discourse" (p.212). Research is needed, according to Rosenberg, on how citizens "orient to one another," and recognize (or fail to recognize) that another person's point of view may be both far different than one's own and worthy of trying to understand (p.215). Both the body of work on deliberative democracy and these future avenues for research suggest that the

ways in which students engage with one another's ideas matters for the development of students as citizens.

Engaging with Others' Ideas and the Disciplinary Practice of Argumentation

Argumentation and engaging with others' ideas. I view learning to construct arguments as a key part of what K-12 students can learn over their time in school. In the middle of the 20th century Toulmin (1958) proposed a model for argumentation that posited that arguments must have a claim, warrant, and backing, a model widely used and cited across disciplines for the past 60 years (Toulmin, 1958). In his model for argumentation, Toulmin highlighted rebuttal as a key aspect of argumentation. In order to effectively counter another student's idea, students must listen to and seek to understand other students' arguments, ask questions, and respond or reference others' ideas, all of which are part of engaging with others' ideas. In the Common Core State Standards, students are asked to "construct arguments and critique the reasoning of others" (CCSO, 2010). The second part of this standard implies that students must listen to and probe the thinking of others in order to develop their argumentation skills. Toulmin and the Common Core State Standards underscore the importance of argumentation to learning across subject areas and I see engaging with other's ideas as an important foundation for developing students' argumentation. Research suggests that students can learn to construct arguments over time outside of traditional subject matter classes (Kuhn & Crowell, 2011).

But, further than seeing argumentation (including engaging with others' ideas) as a set of general skills for students to develop, I see argumentation as a discipline-specific practice, and engaging with others' ideas as an important sub-practice of the disciplinary practice of argumentation. In the section below, I review the role of argumentation within mathematics,

literacy, and social studies. Although engaging in others' ideas is a relatively new concept in the educational literature, an understanding of argumentation in each discipline helps me understand the ways in which engaging in others' ideas is central to each discipline. Focusing on the common practice of argumentation also provides a basis for thinking about similarities and differences in engaging others' ideas across disciplines. In this section, I also note where standards documents in each of these disciplines include student practices that relate to engaging in others' ideas, providing warrant for the centrality of argumentation and engaging with others' ideas to instruction in mathematics, literacy and social studies.

Argumentation in Mathematics. Significant literature in the philosophy of mathematics suggests to me that argumentation is central to mathematics and that engaging in others' ideas is an important part of argumentation in the discipline. One renowned philosopher of mathematics, Imre Lakatos, presented math as a discipline where proofs, conceptions and concepts were not fixed but "fluid and open to negotiation" (Lakatos, 1976; Pease, Colton, Smaill, & Lee, n.d). Some years later, British philosopher Paul Ernest (1998) relied upon Lakatos' ideas to develop a social constructivist (SC) philosophy of mathematics. One of the four assumptions Ernest uses to present this philosophy of mathematics is as follows:

> SC builds on Lakatos's Logic of Mathematical Discovery for negotiation and acceptance of mathematical knowledge, concepts and proofs, within the institution of mathematics and social community of mathematicians. According to this account interpersonal social processes are required to turn an individual's subjective mathematical knowledge claims, after publication, into accepted objective mathematical knowledge (Lakatos [1976], Ernest [1991]).

In this quote, Ernest highlights the centrality of the social process of communication to the construction of mathematical knowledge. I interpret this social process of communication as fundamentally about engaging in others' ideas because the process of entering into "objective mathematical knowledge" involves mathematicians studying others' work and asking questions of it. One public example of this type of mathematical exchange is the Monty Hall problem. On July 21st, 1991, Marilyn Vos Savant answered the Monty Hall problem, a logic problem posed by a reader in the *New York Times*. Instead of accepting the answer to this vexing problem, many readers (including those with advanced degrees in mathematics) wrote into the newspaper to debate Vos Savant's claim (Rosenhouse, 2016). In response, Vos Savant wrote three columns defending her solution, which was eventually accepted. This type of debate is a high-profile example of my conception of mathematics as a discipline of argumentation.

It is important to note that not all mathematicians accept a social constructivist philosophy of mathematics where argumentation is central to the discipline. Yet even these mathematicians are likely to conduct work that grew out of years of communication and argumentation. For example, mathematicians worked for years to create a proof that supports the Goldbach conjecture–- that any odd number is the sum of two prime numbers. This conjecture started with a letter from Christian Goldbach to Leonhard Euler that pointed out that every integer where $n > 5$ is the sum of three primes. In response, Euler pointed out that this would mean that every even integer greater than 2 is the sum of two primes (Dickson, 2005, p. 42). Further argumentation has proceeded to verify that Goldbach's conjecture holds for all integers less than $4 \bullet 10^{14}$. This work resulted in advances in number theory even though the proof remains elusive (Schwarz, Prusak, & Hershkowitz, 2010). In a paper in *Philosopha Mathematica*, Rav (1999) notes that the Goldbach conjecture inspired so many developments in

mathematics that "whether the Goldbach conjecture is correct or not is of no known practical or theoretical importance" (p.7). In essence, Rav argues that the knowledge constructed from engaging with one another's ideas is just as important as the answer mathematicians seek in the first place. Mathematics, Rav concludes, "is a collective art" (p.36), and philosophers of mathematics have repeatedly noted that mathematical argumentation is crucial to the discipline. I interpret these arguments between scholars of mathematics as engaging in the ideas of others because mathematical argumentation inevitably involves probing the thinking of others and holding up another person's ideas next to one's own for the purpose of deliberate study.

One can see engaging in others' ideas reflected as a desirable outcome of school-based mathematics in the Common Core State Standards (CCSSO, 2010) through the standards' focus on mathematical argumentation. In addition to the standards themselves, the mathematical standards list eight Standards for Mathematical Practice that should be cultivated across grades K-12. The third of these standards, "Construct viable arguments and critique the reasoning of others," references expectations of young students specifically. The standard notes that "Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions" and continues to say that "Students at all grades can listen (to) or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments." This vision for constructing and critiquing arguments contains many similar elements to the definition and subcomponents of engaging with others' ideas that I rely upon in this study. Therefore, I posit that being able to engage with others' mathematical ideas is related to mathematical argumentation, which scholarly literature and standards documents have lauded as a key part of doing mathematical work.

Research in mathematics education indicates that with teacher support, K-12 students can engage in argumentation in the mathematics classroom. In a review of literature on the teacher's role in facilitating mathematical discussion, Walshaw and Anthony (2008) found that a multitude of studies show that providing regular time for mathematical argumentation achieves positive results. They also highlight a number of scholars who point to specific practices that support argumentation, such as defending student claims (O'Connor & Michaels, 1996), shaping students' mathematical responses (Stigler, 1988), and continually pressing students for explanations (Fraivillig et al., 1999). Walshaw and Anthony note, however, that a hospitable environment for argumentation is essential for doing this work. Yackel and Cobb (1996) speak to this point in their discussion of the importance of sociomathematical norms. They mention that "a preliminary step in children's developing an understanding of what constitutes an acceptable mathematical explanation is that they understand that the basis of their [evaluations] should be mathematical rather than status-based," and continue on to explain that developing students' ability to analyze explanations on their mathematical merit is no easy task. Building on the work of Yackel and Cobb, Kazemi and Stipek (2001) found that one of the ways teachers can support student argumentation is by teaching students that a mathematical explanation consists of mathematical argument rather than a procedural explanation. In other words, students in many classrooms "describe the steps they took to solve a problem without explaining why the answer works mathematically" (Kazemi & Stipek, 2001, p. 64). That said, Kazemi and Stipek found that 4th grade teachers in their study pressed students to explain *why* their answer was correct mathematical, and students developed the ability to provide more robust mathematical arguments over time. In summary, given adequate support from teachers, students can significantly develop their ability to construct mathematical arguments.

Argumentation in Literacy. Although argumentation is not often explicitly named as a disciplinary practice in literacy, based on my survey of the literature I frame engaging with others' as foundational to argumentation in literacy. One of the most prominent movements in literary theory is dialogism, a belief that language and literature are responses to others' words and literary works. Mikhail Bakhtin, the most noted proponent of this view, believed that language is a "tension-filled environment of alien words, value judgements and accents" (1981, p.276**).** In Bakhtin's perspective, multiple and conflicting voices are crucial to the development of language and literacy. Many classroom researchers came to share Bakhtin's ideas. In a review of the role of discourse in reading comprehension, Nystrand (2006) noted that proponents of dialogism emphasized the "relative perspectives among competing voices" which then "governed comprehension as a dynamic, dialogic event." (p.399). I interpret the work of Bakhtin as related to argumentation because of his emphasis on the exchange of multiple voices and perspectives, ideas that are also central to argumentation.

Despite the presence of dialogism and the connections I see to argumentation, it is difficult to definitively identify argumentation as a disciplinary practice in literacy. One reason for this is that questions remain about specialized knowledge and abilities that elementary school students should attain when reading and composing literature. Furthermore, scholars in fields related to literacy (such as English and Composition) do not agree on the main focus of the field. One effort to codify a specialized set of knowledge and skills needed in literacy was attempted by Susan Goldman, Carol Lee and colleagues who conducted an expert study of literary reading that they termed a "domain analysis" (Goldman & Lee, 2015; Goldman et al., 2016). Drawing on studies of literary experts and rhetorical and literary theorists, Goldman and Lee identified five categories of knowledge that students should use to inquire deeply into text: knowledge of

epistemology, inquiry strategies, key concepts/frameworks, types of texts, and discourse and ways of using language (Goldman & Lee, 2015; Goldman et. al., 2016). Each of these five ways of working with text necessitates that the reader put themselves in conversation with the text, measuring one's own ideas about the text with those intended by the author (e.g., Bakhtin, 1986). Because of the centrality of asking questions and developing claims, I interpret the work of interrogating text as similar to the work of argumentation.

The importance of argumentation in elementary literacy classrooms, and specifically engaging in others' ideas, is made clear by the Speaking and Listening component of the Common Core State Standards for English Language Arts (NGO & CCSSO, 2010). In third grade through fifth grade, these standards delineate how students should become more skilled at "Engaging in collaborative discussions with diverse partners, building on others' ideas and expressing their own clearly" (NGO & CCSSO, 2010, p.24). As a sub-bullet of this larger standard, fourth and fifth grade students are asked to "pose and respond to specific questions by making comments that contribute to discussion and elaborate on the remarks of others." This text indicates to me that according to the Common Core State Standards, learning to engage with others' ideas is an important aspect of literacy learning in upper elementary schools.

Research in literacy education suggests that students can engage in literacy-related argument and that teachers can support this work. This literature has largely focused on how students learn argument writing skills, rather than how students construct and respond to arguments about literature in classroom discussion. In a study of how students' argument writing develops over the course of schooling, Knudsen (1992) found that on average, students' argument writing improves over time from 4th through 12th grade, yet students remained weak at providing proof to support a claim. Studies that have looked at teachers' interventions have

shown that students can improve their writing with teacher help. In a systematic international review of nonfiction writing instruction focusing particularly on argument writing, Andrews, Torgerson, Low and McGuinn (2006) found that oral argument, practice in using counterclaims, and a writing process encouraged students to plan, draft, revise, and edit were some of the most effective strategies for helping students develop their nonfiction writing. Unfortunately, however, teachers do not always feel prepared to teach students argumentation. In a national survey of 4th to 6th grade teachers, Gilbert and Graham (2010) found that teachers overall felt ill-prepared to teach writing, and particularly persuasive writing. Evidence from this body of literacy-related literature seems to suggest that students can develop their argumentation skills, particularly in writing, and that some approaches doing this may be particularly supportive of students' argumentation skills.

Argumentation in Social Studies. Argumentation and engagement in others' ideas is also foundational to the discipline of history. Historians often make claims in response to other historians' interpretations, either arguing for or against a given interpretation of evidence or discussing multiple interpretations before identifying one that they find is best supported by evidence (Coffin, 2006, as cited in Monte-Sano, 2016). These claims form the basis of new knowledge in history, informing the public's view of the past. Yet new knowledge and interpretations are not commonly accepted by other historians until they have the chance to thoroughly examine the argument at hand. Unlike scientists, Mink (1966) notes, historians "must read one another's books instead of merely noticing their results" (p.77). Specifically, historians assess the evidence their colleagues use through reading their footnotes (Collingwood, 1999). I view the argumentation and interpretive work of historians as a form of engaging with one another's ideas because historians carefully examine the ideas of their colleagues, assessing

whether their argument meets the standards set out by the discipline. Thus, I see argumentation and engaging in others' ideas as essential to the creation and acceptance of new knowledge in history.

Historians have frequently lamented the ways that history has been presented in classrooms as closed rather than open for debate. In a book on the nature of historical thinking and its implications for classrooms, historian Thomas Holt decries the authoritative passages that are devoid of footnotes in history textbooks that "cannot help but impress upon children that history calls for cut and dried answers: that it cares mostly about austere processes and developments" (Holt, 1990, p. 20). Instead, Holt argues, children should analyze historical evidence and develop their own interpretations that they discuss with the class in order to mirror the work of historians. I interpret engaging with others' ideas as central to this process that Holt describes because this vision of social studies calls for children to pose and critique one another's claims and interpretations of evidence. Holt's view that argumentation is fundamental to learning in history is also found in the C3 Framework for State Social Studies Standards (NCSS, 2013), which was developed by experts from each major social studies discipline. There, authors identify "Evaluating Sources and Using Evidence" as one of the four major dimensions of social studies inquiry. This section asserts that students should evaluate sources and use evidence in order to "make evidence-based claims" (p. 53), which is a key part of constructing an argument. One of the two key aspects of the final dimension of the framework, "Communicating and Critiquing Conclusions" relates even more closely to engaging with others' ideas because children must study another person's idea and consider it in relation to one's own in order to effectively critique their idea. Children must also understand the ideas of others if they are to craft and communicate an argument that appeals to their audience. Thus, both scholars of history

and standards documents assert that argumentation and engaging in others' ideas are foundational to the nature of history.

Engaging with Others' Ideas and Subject Matter Learning

Recent research has indicated that engaging in others' ideas is associated with positive outcomes in both mathematics and literacy. In this section, I review research on the relationship between engaging with others' ideas and student learning in each of these subject areas. While the term *engaging in others' ideas* comes out of the mathematics education literature, I review research on literacy learning that I interpret as analogous to the concept of engaging in others' ideas based on researchers' explanations of their phenomena of interest. The research presented below forms an important backdrop for my research.

Engaging with Others' Ideas and Mathematics. Engaging with others' ideas has been most persistently investigated by a team of math education researchers from UCLA conducting research in third and fourth-grade classrooms at a diverse elementary school near their university (e.g., Franke et al., 2015; Ing et al., 2014; Webb et al., 2014). The team worked in six classrooms over the course of a school year and recorded both small- and large-group conversations. Based on these conversations, researchers created two variables for each student. The first described the level at which students engaged with other students' ideas, while the second variable described the level at which other students engaged with the focal student's ideas. The researchers found that each of these variables was positively correlated with students' ability to carry out valid problem-solving strategies on researcher-designed assessments of students' mathematical thinking about operations, place value, and fractions. In other words, students who showed a) high levels of engagement with other students' ideas, or b) other students engaging at high levels with their ideas, were likely to show higher levels of student achievement as measured by a

researcher-designed assessment of students' mathematical thinking, even after controlling for students' performance on a pre-assessment (Webb et al., 2014).

In addition to describing the relationship between engagement with others' mathematical ideas and students' mathematical thinking, these researchers also developed categories describing *how* students engaged with one another's ideas. Franke and colleagues found that not all student talk constituted an equal amount of attention to other students' mathematical ideas. Therefore, they coded student turns of talk as low, medium, or high engagement with other students' ideas. I present a table with examples of each level of engagement in Figure 1 below. Franke and colleagues noted that the categorization of student responses as high, medium or low pertained to "the level of detail a student provided about another student's ideas and whether the student contributed mathematical ideas beyond what was originally provided" (Franke, 2015, p. 131). In other words, if students spoke more specifically about an idea their classmate shared, researchers coded this contribution as higher engagement than if a student referred to another student's work in passing. Franke and colleagues then assigned each student with a variable for the highest level of engagement with others' ideas that they showed over the course of data collection. In other words, if students had only engaged with others' ideas at a low level, they received a "0", while students who engaged with others' ideas at a higher level received a "2." The researchers then combined these variables with variables related to student explanations and whether other students engaged with their idea to assign "student participation" variable to each student. Franke and colleagues then tested the differences between students who participated at different levels. They found that student participation positively predicted student achievement, as students who engaged with others' ideas and explained their thinking more skillfully showed higher levels of mathematics achievement (Ing et al., 2015).

Figure 1. Levels of student engagement with others' ideas from Franke et al., 2015, p. 131

Level of Engagement	Description	Example
Low	References another's idea in a general way	• Says "I agree" or "I disagree" with an idea that was shared • Gestures to the strategy that most closely resembles their own strategy
Medium	References the details of another's idea	• Repeats the details of what a student had shared • Explains another student's strategy after he or she had written it on the board
High	References the details of another's idea while making a new contribution	• Adds further detail to another student's strategy • Provides a correction to an incorrect portion of a student's solution • Proposes an alternative solution and explains how it is different from the idea already posed • Co-constructs a solution with another student

In more recently published research, Webb and colleagues focused more specifically on how students engage with others' mathematical ideas when teachers are not present to guide student thinking. In this study, Webb (2017) worked closely with a 4th grade teacher for a number of months, and analyzed the ways in which 16 pairs of students interacted with one another during three days of instructional time. During these focal days, the class session opened with a 10-20 minute number sense activity before students worked together to solve multi-digit multiplication and division word problems for 30-40 minutes before ending the class with a whole class wrap-up. Focusing on data from the middle section of the class where students worked independently with their partners, Webb and colleagues found that of the 16 partnerships, 12 partnerships "showed sustained and synchronous engagement with others' ideas during the entire extended pair-share part of the lesson" (Webb, 2017, p. 7) while the other four partnerships worked largely independently from one another. Among students who engaged with one another's ideas, the authors identified two distinct patterns for how the students worked together. In the first pattern, one student took the lead for solving the problem while the second student engaged with their ideas by asking questions about it, while in the second pattern,

students worked jointly to solve the problem. The authors noted that across both of these types of shared work, students employed a number of moves that they repeatedly used to engage with others' ideas. These moves included asking questions of others' ideas, revoicing and rephrasing each other's ideas, challenging each other's ideas, and adding on to ideas that other students proposed. This study is perhaps the clearest example so far of scholarship that looks specifically at how students engage with others' ideas in mathematics.

Engaging with Others' Ideas and Literacy. Though approaches to literacy instruction that centrally feature discourse have been commonplace in research on literacy development (e.g., Reciprocal Teaching (Palincsar, 1986), Questioning the Author (Beck, McKeown, Sandora, Kucan, & Worthy, 1996), research on students engaging with others' ideas about text is scant. As Aukerman (2007) notes, this may be because approaches to discourse-based literacy instruction often rely on explicit instruction, modeling, or teacher-led scaffolding in order to improve comprehension. Aukerman (2007, 2013, 2016) takes on the challenge of bringing out students' ideas about text and helping them respond to one another through group work with upper elementary students as a form of comprehension instruction. In her work, she dubs this approach "Shared Evaluation Pedagogy." This work calls for students to pose ideas about text and respond to each other's interpretations; therefore, I interpret this pedagogy as one that emphasizes students engaging with one another's ideas. Aukerman relies on the work of Bakhtin (1981) to reframe students' engagement in comprehending text as "comprehension-as-sensemaking" (Aukerman, 2013). She notes that shared evaluation pedagogy is primarily defined through an epistemic stance that takes student intentions around text very seriously, that provides a space for children's own evaluative stances to come to the fore, and that sees the construction of "internally

persuasive" (Bakhtin, 1981, p. 345) textual understanding as a dialogic process without a pre-designated outcome.

Aukerman (2007) illustrates her views on the importance of the dialogic process in reading instruction through an analysis of a small group conversation among struggling fifth grade readers about Andrea Pinkney's version of an Aesop's fable, "The Miller, His Son, and Their Donkey." Over the course of the conversation, students worked through a running disagreement about the meaning and pronunciation of the word *beast*. At the outset of the story, Thomas read the word "beast" as "best." Rather than correcting the error, the students' teacher, Max, let the reading and conversation continue uninterrupted. Soon enough, however, Adam revealed that he had read the word differently.

Figure 2. Excerpt 1 from small group discussion in Aukerman, 2007, p. 72.

ADAM: Um, (looking down at text) it says up in front that, um, the, a miller and his son set out to market to sell their *donkey*, (looks at Max, then back at text) and, leading th-, the beast behind them. (looking at Max) I mean, maybe the donkey [was//]

THOMAS: [The *best.*]

ADAM: The// (looks at Thomas, then looks at text) Doesn't it say beast? (glancing quickly at Thomas before returning his gaze to Max)

After the exchange depicted in Figure 2, Thomas went back to the text and reread the passage he had read before with the word "beast." Aukerman notes that Thomas "only assumed responsibility for verifying his own claim after it became clear that the teacher in no way was going to settle it for the two of them" (p. 73). This was the first example of what Aukerman saw as students assuming increased ownership of the discussion as the conversation progressed without the teacher evaluating students' ideas. As the discussion continued, students continued to revisit the definitions of the word "beast" that one another had posed. For example, later on in

the conversation, Alfredo (another student) revisited Thomas' definition of the word "beast" as follows:

Figure 3. Excerpt 2 from small group discussion in Aukerman, 2007, p. 87.

MAX: Okay, Alfredo, what do you think?(inaudible)
ALFREDO: You know when Thomas said that beast meant big=
MAX: =Yeah.=
ALFREDO: =And strong?
MAX: Uh huh.
ALFREDO: Well [I don't, I don't think//
THOMAS: [I didn't say that.]
ALFREDO: Yeah you did.
THOMAS: I didn't say beast means big and strong.
ALFREDO: You said big.
JENNY: You said there's two=
THOMAS: =Yeah!=
JENNY: =definitions for beast.
THOMAS: There is. Big! [Like tall!
ALFREDO: [And then] why are they, why are they calling him big if he's skinny. Or beast?

In this segment, Aukerman points out, students were "engaging in a collaborative construction of meaning at a level that was at once quite basic (the meaning of one word) and highly sophisticated (their use of textual evidence)" (p. 87). In reflecting on the discussion at large, Aukerman surmised that "In short, students not only had the opportunity to engage in 'response to literature,' though that was an important dimension; the pedagogy was simultaneously and equally about response to each other" (Aukerman, 2007, p. 94). In other words, Aukerman found that students in this conversation both responded to literature and engaged with others' ideas simultaneously. In a subsequent randomized control trial of shared evaluation pedagogy, Aukerman and colleagues found that 26 fifth-graders who engaged in

shared evaluation pedagogy showed greater gains on researcher-based measures of comprehension and decoding than 41 control-group students (Aukerman, 2016). In sum, both qualitative and quantitative research on shared education pedagogy appears to suggest that engaging with others' ideas in this way supports reading comprehension among upper elementary school students. This research is the most robust body of evidence that studies the relationship between engaging with others' ideas and student learning in literacy.

Status and Authority in How Students Engage with Others' Ideas

As part of my investigation of how students engage with others' ideas, I examine how socially-constructed authority shapes students' engagement with others' ideas. Amit and Fried (2005) define authority as a relationship that "exists when one person or a group of people tends to obey, act on, or accept without question the statements or commands of another person (p. 147). I define socially-constructed authority as differences in academic and social power resulting from the ways in which students position themselves in relation to one another. This definition relies on the work of Langer-Osuna (2016; 2017). Langer-Osuna does not provide a consistent definition of authority, but regularly uses the same language to describe what she is interested in studying. She repeatedly frames her work as interested in how students "negotiate relationships of power" (Langer-Osuna, 2016, 238). Langer-Osuna also often notes that socially-constructed authority is relative. For example, she highlights that students' "positions of authority relative to one another is central to understanding" (Langer-Osuna, 2016, p.107) how students collaborate. I interpret these themes as central to Langer-Osuna's work on authority, and in the absence of a clear definition, I synthesized these themes to create the definition above. At the same time, my definition differs from the work of Langer-Osuna because I use the term "socially-constructed authority" rather than "authority" alone to indicate that authority is

constructed through countless interactions in the classroom, including during subject area learning.

Recent scholarship on socially-constructed authority traces its intellectual roots to mid-90s research on classroom status and status hierarchies. Cohen (1994, p.27) defined status as "an agreed upon social ranking where everyone feels it is better to have a high rank than a low rank." Cohen found that differences in status shape who talked, who listened, and whose ideas gained prominence in small group discussions. In attempts to address these differences in status, Cohen and Lotan found that teachers could intervene in classroom interactions by "assigning competence" to lower-status students. In order to assign competence, Cohen and Lotan theorized, teachers would need to recognize intellectual contributions of students and name them publicly in order to produce more equal-status behavior in heterogeneous classrooms (Cohen & Lotan, 1995). One example of assigning competence these authors provide came from one of the teachers in Cohen and Lotan's study. The teacher described her work to assign competence as follows:

Figure 4. Candida Graves' description of assigning competence, from Cohen & Lotan, 1995, p. 104.

> One day I had a student named Juan. He was extremely quiet and hardly ever spoke. He was not particularly academically successful and didn't have a good school record. He had just been in the country for two or three years and spoke just enough English to be a LEP student. I didn't notice that he had many friends, but not many enemies either. Not that much attention was paid to him.
>
> We were doing an activity that involved decimal points, and I was going around and noticed he was the only one out of his group that had all the right answers. I was able to say, "Juan! You have figured out all of this worksheet correctly. You understand how decimals work. You really understand that kind of notation. Can you explain it to your group? I'll be back in a minute to see how you did." And I left. I couldn't believe it: He was actually explaining it to all the others. I didn't have faith it was going to work, but in fact he explained it so well that all of the others understood it and were applying it to their worksheets. They were excited about it. So then I made it public among the whole class, and from then on they began calling him "the smart one." This spread to the area where he lived, and even today kids from there will come tell me about the smart one, Juan. I thought, All of this started with a little intervention!

In the quote above, the teacher both identifies the status differences between Juan and other students, and takes steps to intervene in order to highlight the student's strengths for the class. This work on status, while still relevant today, formed the precursor for issues of authority that I explore in this study.

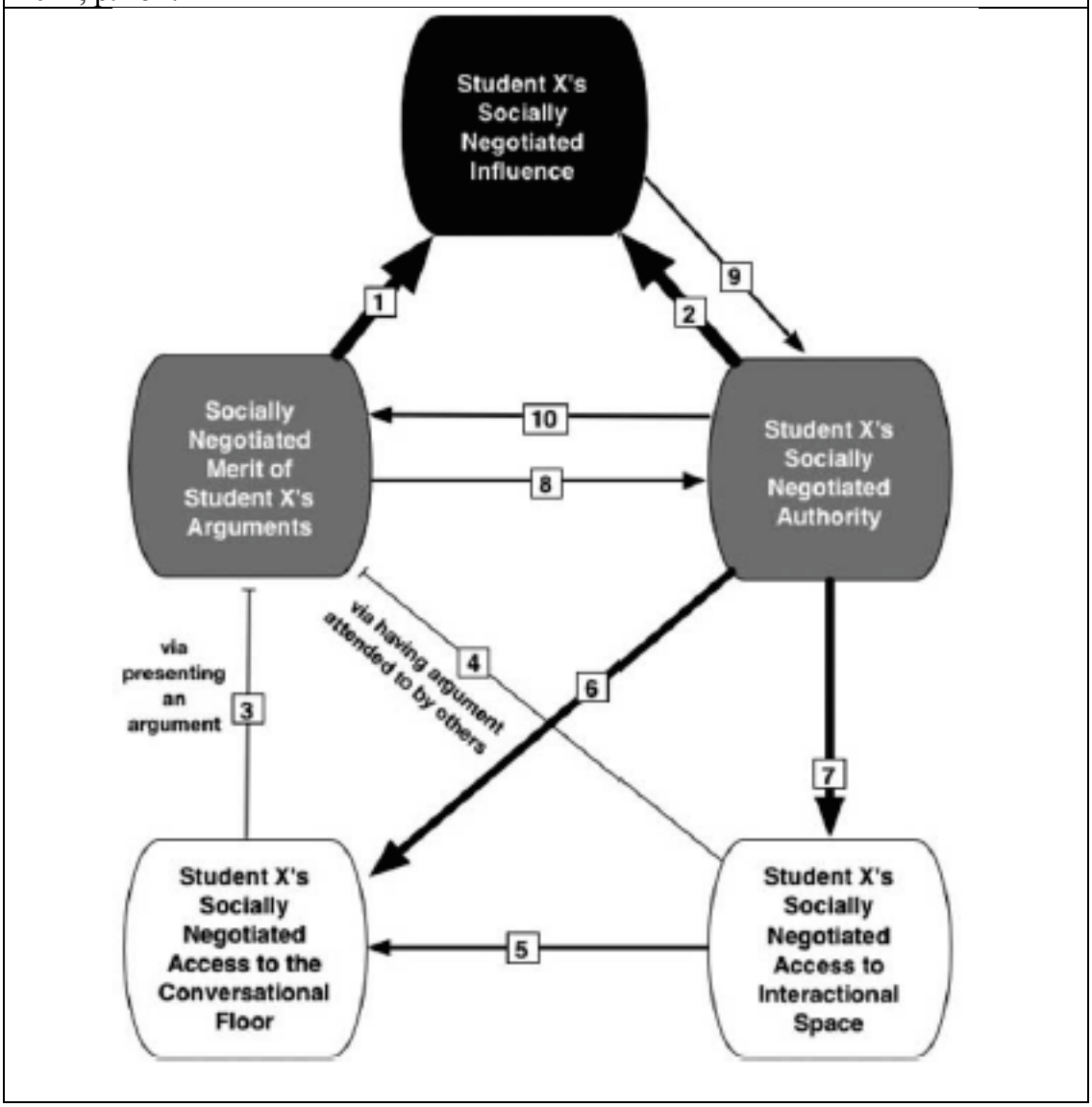
A more recent strand of scholarly work explores the ways that authority is distributed among students in the collaborative mathematics classroom. In 2005, Amit and Fried offered a call for mathematics education researchers to examine authority relations in the mathematics classroom. This call was taken up by researchers in mathematics education who merged research on status with research on positioning theory to argue authority is often constructed based on social dominance rather than students' ideas (Langer-Osuna, 2017). In a study of fifth-graders,

Langer-Osuna (2016) found that one girl established her intellectual authority by issuing social directives to her partner, thereby establishing social dominance first before taking control of the mathematical work. Through in-depth investigations of cases, Langer-Osuna also highlighted the ways in which a student's identity and authority was co-constructed in a 9th grade algebra classroom (Langer-Osuna, 2015) and how students' displays of authority were interpreted in ways that differed by gender (Langer-Osuna, 2011). In my work, like that of Langer-Osuna, I analyze classroom interactions where issues of authority may be at play. At the same time, I extend Langer-Osuna's work by examining classroom interactions where issues of authority are at play in multiple subjects in one classroom.

Engle and colleagues have also proposed a framework (see Figure 5) for how students influence one another in small group discussions (Engle, Langer-Osuna, & McKinney de Royston, 2014). This framework reflects how each student's socially-constructed authority, the merit of each student's arguments, each student's access to the conversational floor all affect the level of influence a student has in a group discussion. These scholars created this framework based on a student-led science discussion among 5th graders, a discussion they chose to analyze because one student, Brian, was particularly influential in this discussion despite the normatively lower quality of his arguments than any of the other four students. The students were assigned to discuss whether orcas were dolphins or whales, a topic that arose organically from the class' study of endangered species. Based on information provided by marine biologists at a field trip the previous day, the other students in Brian's group argued that orcas were dolphins. Yet, by the end of the discussion, Brian had convinced all except one student that orcas were whales, an incorrect conclusion. Brian later gave himself credit for being the most influential person in the argument. Based on analysis of this discussion and their theoretical framework, Engle and

colleagues concluded that students were likely to hold different levels of authority and access to the conversational floor, all of which contributed to the amount of influence students had in the discussion. Engle and colleagues' framework began to generalize research on authority in ways that apply to disciplines outside of mathematics education, work that I continue by focusing on how issues of status may shape the ways in which students engage with others' ideas across subjects.

Figure 5. Framework for students' influence in a group discussion, from Engle et al., 2014, p. 251.



Research on engaging with others' ideas is only just beginning to consider how issues of authority affect the ways in which students engage with one another. In his doctoral dissertation, Johnson (2017) studied the ways in which student competence – a form of status – was constructed and assigned in two third grade classrooms. He found that constructing competence around students' explanations and ideas allowed students to make a wide variety of contributions and engage meaningfully with other students' ideas. Johnson also found that students showed high achievement on a year-end assessment of multiplication and division, perhaps suggesting that attention to competence helped students learn. Johnson's emerging work on the relationship between status and how students engage with others' ideas suggests that this is an important line for further research. Although scholars have shown that authority has significant effects on group work and discussion, we know little about how issues of authority influence the specific phenomenon of students' engagement with others' ideas. I extend work on authority and Johnson's research by identifying instances in which authority affects the ways students engage with one another over the course of many discussions in multiple subject areas.

Teaching that Supports Students' Engagement with Others' Ideas

Content area teaching with multiple goals and citizenship in mind

Scholarly literature focused on elementary school classroom teaching has often suggested that teachers have multiple goals in mind in any given lesson or moment. Teacher researchers Lampert (1985, 2003) and Ball (1993a, 1993b) have been particularly prominent in this literature. Lampert (1985) made this particularly clear in her description of the ways in which teachers manage dilemmas while engaged in classroom practice. She presents two classroom anecdotes -- her decision-making process as she chose whether or not to stand next to a group of unruly boys in her 5th grade math classroom, and the thought process of a fellow teacher who

grapples over whether to tell a student an incorrect answer is correct. Lampert writes that the teacher "brings many contradictory aims to each instance of her work, and the resolution of their dissonance cannot be neat or simple" (179). Likewise, Ball describes juggling the mathematical content, discourse, and the community in ways that are "intellectually honest" while exploring odd and even numbers with a diverse class of 3rd grade students (Ball, 1993). Considering this research, it is surprising that scholarly literature on elementary school classroom teaching and learning tends to focus on teaching with one particular goal in mind.

At least one group of scholars has now begun to explore whether discussions can support both subject matter learning and democratic education. Michaels, O'Connor, and Resnick (2007), for example, argue that accountable talk in the context of subject matter instruction can achieve both of these purposes. They identify subject matter learning and democratic education as "two heretofore largely independent strands of work" (p. 285), and while they situate themselves as cognitive researchers who investigate subject matter learning, Michaels, O'Connor, and Resnick frame accountable talk as a potential "societal mechanism for preparing citizens to participate in democratic deliberation in civic arenas." This study builds off these researchers' call to investigate subject matter instruction with both academic and citizenship purposes in mind. I see group discussion as a practice that provides opportunities to do both the academic and democratic work that Michaels, O'Connor, and Resnick support. I view facilitating classroom discussion as a teaching practice that can advance both academic and citizenship goals; therefore, I make this pedagogical practice the focus of both this review and my research.

Facilitating Classroom Discussion

In the sections below, I present research that studies teaching in each of my focal content areas that encourages students to engage in one another's ideas. I view engaging students' ideas

as a part of the teaching practice of facilitating a discussion; therefore, I review literature on facilitating discussion in each discipline before zooming in on research that sheds light on how teachers might support student engagement with one another's ideas more specifically. It is important to note that research in literacy more often refers to the broader term discourse (all academic talk) than discussion (extended talk where student build upon one another's ideas), so I use the term "classroom discourse" in reviewing literacy research. Furthermore, research in social studies has not yet addressed how to support students in engaging in one another's ideas. The literature presented below will inform how I think about my third research question concerning how teachers support students' engagement in others' ideas.

Facilitating classroom discussion in mathematics. Despite long-held cultural scripts that constrain student talk in mathematics classrooms in the United States (Stigler & Hiebert, 1999), mathematics education researchers have often highlighted the central role of classroom discourse in students' mathematics learning. Mathematics education researchers have primarily focused this research on classroom *discussion*, and some explicitly distinguish classroom discussion from other types of mathematical discourse. For example, McCrone (2005) defines mathematical discourse as "the exchange of mathematical thoughts and information in a learning environment (112)," while defining discussion as "one aspect of discourse, namely, to describe the nature of small group and whole group discussions focused on making sense of mathematics problems (112)." I define classroom discussion as a type of mathematics discourse that involves extended classroom talk where students build upon one another's ideas. Therefore, I focus this section of my literature review on discussion in the mathematics classroom.

Significant evidence shows that classroom discussion in mathematics is supportive of students' learning, particularly when teachers spend time learning to facilitate discussions. One

of the most robust programs of research on discussion in mathematics came from Project Challenge, an intervention and research project involving five hundred 4th through 6th grade students attending district schools in a low-income town in Massachusetts. Researchers led sustained work with teachers to improve their ability to lead classroom talk in ways that would be mathematically productive (Chapin & O'Connor, 2007; Chapin, O'Connor & Anderson, 2009). Teachers learned to hold extended group discussions where students made mathematical claims and were asked to provide evidence to support their claims. These discussions often centered on math concepts and procedures that students wondered about or did not understand (Chapin, O'Connor & Anderson, 2003). Students in every cohort who participated in the intervention achieved significant gains in mathematics as compared to students in control classrooms. As noted by the National Council for Teachers of Mathematics in a research brief on the benefits of discussion, this program of research provides "compelling evidence" that facilitating discussion in the mathematics classroom may be highly beneficial for students' mathematical learning (NCTM, 2011). It is important to note that the program of research led by Chapin and O'Connor focused not only on whether students learn from discussion, but also how students participate in discussion and how students can be supported in learning through discussion, foci that match my interests in this study.

Research in mathematics education has also shown that teachers have a vital role to play in supporting discussions that lead to student learning. At a fundamental level, research suggests that students benefit from teachers who cultivate classroom environments where student autonomy and argumentation is prized (Ball, 1993; Yackel & Cobb, 1996). Teachers can then leverage student talk as a form of thinking (Sfard & Kieran, 2001) that can push students to think conceptually about the mathematics at hand (Kazemi & Stipek, 2001). Building off the work of

Yackel & Cobb (1996), Kazemi and Stipek (2001) conducted their research in upper elementary classrooms and articulated four "sociomathematical norms" that characterized discussions where students thought conceptually. In these discussions, teachers created classroom environments where a) student explanations consisted of mathematical arguments, b) mathematical thinking involved understanding relations between strategies, c) errors were embraced as sites for learning, and d) collaborative math work involved both individual accountability and reaching group consensus (Kazemi & Stipek, 2001). In particular, Kazemi and Stipek noted that the level of "press" that teachers made for students to adhere to these norms made a difference for how students spoke to one other about mathematics. For example, Kazemi and Stipek provided the discussion below as an example of the teacher using "high press" in a way that would support students in creating mathematical arguments:

Figure 6. Teacher using "high press" to sustain sociomathematical norms (Kazemi & Stipek, 2001, p. 67).

Ms. Carter: So they got two and they got a ½ and ⅛. Oh, you did a good job drawing that. But then you say they got two and ⅜ . . . I see the two.	*Ms. Carter:* I see. So that's ½ and ⅛, and you're saying that's not a picture of 2⅜. Or what are you saying? I'm not quite sure.
Carmen: Uh huh. That's what he said [referring to Edgar], and I told him, "Why did we get 2⅜?"	*Carmen:* I don't know. I told him, "How [did you get] the answer 2⅜?"
Ms. Carter: Why don't you agree with that?	*Edgar:* I thought that . . .
Carmen: I don't know. Because this is ½ [points to half shaded on square], and you put a little piece [draws next to half what looks like ⅛], and that's ⅛.	*Carmen:* And I told him, and he said, "Because I know."
	Ms. Carter: Remember the one thing I always need is that I need you to be able to explain it.

In ensuing years, however, specific classroom scholarship has demonstrated the complexity of supporting students in leading productive mathematical discussions. For example, Franke and colleagues (2009) found that while teachers often ask initial open-ended questions

such as “How did you get that?” to encourage students to explain their thinking, follow-up questions varied widely and sometimes shut down student thinking. Encouragingly, research has demonstrated that teachers can improve in the ways they elicit students’ ideas and facilitate discussion (Bobbys et al., 2007). Bobbys and colleagues conducted professional development on understanding students’ mathematical thinking for 89 teachers in an urban school district over the course of one school year, and found that students with these teachers showed greater conceptual understanding of the mathematics at hand while participating teachers showed greater understanding of ways students might reason algebraically (Bobbys et al., 2007). In another study, Bobbys and colleagues demonstrated that given time and support, teachers can become more adept at attending to children’s strategies, interpreting children’s understandings, and deciding how to respond (Bobbys et al., 2010). Collectively, these results suggest that teachers have a significant role to play in orchestrating mathematical discussion and that teachers can learn to do this work.

Supporting students’ engagement with others’ ideas in mathematics. Franke and her colleagues (2015) also studied the role of teacher support moves in providing opportunities for students to engage with one another’s ideas. They found that teachers’ initial invitations for students to engage with each other’s ideas fell into six categories: explain someone else’s solution, discuss differences in solutions, make a suggestion about another student’s idea, connect one student’s idea to another student’s idea, create a solution together with other students, or use a solution that was offered by another student (Franke et al., 2015). However, the authors found that these invitations did not determine the level at which students engaged with one another’s ideas. Instead, Franke found that follow-up support moves in the form of “probing,” “scaffolding,” and “positioning,” were most likely to help students engage with one

another's ideas in detailed ways (Franke et al., 2015). The transcript below provides an example of the ways in which these supportive moves deepened students' engagement with one another's ideas.

Figure 7. How a teacher supported engagement with others' ideas from Franke et al., 2015, p. 140.

1 Ms. L: Can somebody talk us through Eliana's computation? [calls up Aaron to explain what Eliana had put on the board] INVITATION
2 Aaron: What she did, since there's 5 rows of 25, she did 25 plus 25 plus 25 plus 25 plus 25 equals 125. And she plussed 18, and then got 133.
3 Ms. L: Questions or comments? INVITATION
4 Paige: I don't really agree with that answer. Cause . . . [Ms. L interrupts]
5 Ms. L: Tell [Eliana]. POSITIONING
6 Paige: [Paige goes up to the board]. I think you only need to change one number in it. Which is the 3. Because . . .
7 Ms. L: Convince her. POSITIONING/PROBE
8 Paige: 125 plus 13. 5 plus 8 is 13. I put the 3.
9 Ms. L: Show it next to hers. POSITIONING/SCAFFOLDING
10 Paige: [writing on the board] And the 10 right here. And then I did 1 plus 2 which is 3. And I added this one more 10, which is 4. So you put that right there. And then you add the 1. [showing the standard algorithm for adding 125 + 18 to get 143]
11 Ms. L: You know, I like what you said there. [continues interchange]

This transcript provides an example of how a teacher might support students in engaging with one another's ideas. Ms. L specifically references Aaron's ideas, and invites students to comment on them. Later, Ms. L tells Paige to talk directly to Aaron, and gives Paige tips for convincing Aaron. These moves orient students to one another in an effort to engage students in each other's ideas. My dissertation study seeks to follow up on Franke and her colleague's work on teacher support of students' engagement with others' ideas, extending this research into other subject areas.

Facilitating classroom discourse in literacy. In the early 1990s, research derived from Bakhtin's work on dialogism attempted to assess the effects of classroom discourse on reading comprehension. Though these researchers found that classroom discourse was minimal in middle and high school English classrooms (Nystrand & Gamoran, 1997), they found that discourse-based approaches to developing understanding were supportive of improved reading comprehension (e.g., Applebee, Langer, Nystrand, & Gamoran, 2003). Yet other scholars have established the benefits of approaches to literacy learning based on classroom discourse. One approach with a particularly strong research basis is "reciprocal teaching." Based on multiple interventions with struggling readers, Palincsar and Brown (1984) found that the reading comprehension of 7th grade students improved after they participated in "reciprocal teaching" (Palincsar & Brown, 1984). In this approach to supporting comprehension, student first worked with a teacher to question, summarize, clarify, and make predictions based on text, then took increasing responsibility for posing ideas about these four areas of work on their own. Though not always framed as a form of classroom discourse, this teaching consisted of a regular exchange of ideas between and among students and teachers, thereby meeting my criteria for classroom discourse. In the study (Palincsar & Brown, 1984), students in the treatment group that participated in reciprocal teaching showed both quantitative and qualitative improvements from the beginning to the end of the intervention, as these students scored higher on tests of comprehension and improved in their ability to summarize and ask questions of text. These improvements persisted in transfer tasks, and treatment students (composed entirely of struggling readers) reached the average comprehension level of their average general education classmates (Palincsar & Brown, 1984).

Research in elementary classrooms has consistently demonstrated that facilitating discourse based on reading texts aloud can support vocabulary development and reading comprehension. Beck and McKeown (2001) noted that students need experiences that help them construct meaning from decontextualized text in order to move away from relying on illustrations and background knowledge as sources of meaning making. These scholars developed an approach to literacy learning known as "Text Talk" which uses open-ended questioning (Beck, McKeown, Hamilton, & Kucan, 1997) to help students discuss narratives that are more complex than they could read on their own (Beck & McKeown, 2007). In Text Talk, teachers choose books and ask questions in ways intended to spur significant discussion. As an illustration of this, Figure 8 provides the guidance Beck and McKeown provide to teachers about doing this work.

Figure 8. Components of Text Talk approach to book discussions (Beck & McKeown, 2007, 78).

Components	Text Talk approach
Selection of texts	Stories that exhibit an event structure and some complexities of events to provide grist for children to build meaning.
Initial questions	Interspersed open questions require children to describe and explain text ideas, rather than recall and retrieve words from text.
Follow-up questions	Questions scaffold students' thinking by using their initial responses to form questions that encourage elaboration and development of initial ideas.
Pictures	In general, pictures are presented after children have heard and responded to a section of text.
Background knowledge	Invitations for background knowledge are issued judiciously to support meaning building rather than encouraging students to tap into tangential experiences.
Vocabulary	Some sophisticated words are selected for direct attention after reading and discussion of the story is completed.

Beck and McKeown then proceeded to study this approach to generating discussion through read aloud text. Based on multiple studies of work with kindergarten and first grade students, Beck and McKeown (2007) found that students who participated in these discussion-based read aloud experiences knew 30-40% more words on a post-intervention test than they did on a pre-test. Baker and colleagues (2013) also found positive results of read alouds with first graders that featured frequent interactions between teachers and students. Using an experimental design, the authors found significant increases in both students' vocabulary and their ability to retell narrative text, a measure of comprehension development (Baker et al., 2013).

Though reciprocal teaching and interactive read alouds have a particularly solid research base, these are only two of many forms of classroom discourse that have been associated with increased text comprehension. Murphy and colleagues (2009) published a meta-analysis of approaches to classroom discourse in literacy and their effects on student learning. These researchers studied nine approaches to classroom discourse focused on text, and found that these approaches serve at least three different purposes. The first purpose for discussions identified by the authors was to help students with "querying and critiquing the underlying arguments and evidence in the text." Calling this a "critical-analytic stance," Murphy and colleagues noted that Collaborative Reasoning, Paideia Seminar, and Philosophy for Children were all approaches to discussion that took a critical-analytic approach. Next, Murphy and colleagues noted that Instructional Conversations, Junior Great Books Shared Inquiry, and Questioning the Author all shared the purpose of helping students acquire information from the text. Finally, the authors termed Book Clubs, Literature Circles, and Grand Conversations types of discussions that intended to help students appreciate text and develop their emotional reactions to it, which they called an expressive

stance. In their review of the literature, Murphy and colleagues found that many of these approaches were successful at building literal and inferential comprehension and increasing student talk while decreasing teacher talk. At the same time, however, Murphy and colleagues found that across the various stances, these approaches to discussion were infrequently effective at helping students develop critical thinking skills, reasoning skills, or the ability to develop arguments about text. In a related study on the characteristics of these nine approaches that were most supportive of learning, these authors found that efferent approaches tended to provide more opportunities for elaborated student thinking, while expressive and critical-analytic approaches provided the most opportunities for students to engage in high-level thinking and reasoning (Soter et al., 2008). Across all approaches, Soter and colleagues found that productive discourse (defined as discourse with features such as student-elaborated explanations and use of authentic questions) occurs most often when students hold the floor for extended periods of time, when students are prompted to discuss texts through open-ended and authentic questions, and when students and the teacher build upon one another's ideas (Soter et al., 2008).

Supporting students' engagement with others' ideas in literacy. Although literacy research has largely not examined *how* students engage with each other's ideas, a small body of classroom research provides initial evidence as to how teachers might support students' engagement with others' ideas. One study of a fourth-and-fifth grade classroom of English Language Learners focused on how teachers promote student talk that is "extended, coherent, and socially engaged" (Boyd & Rubin, 2006, p.163). I view this kind of student talk, labeled by Boyd and Rubin (2002) as "student critical turns" or "SCTs" as a type of talk that would occur in a classroom where students engaged in one another's ideas. In their

research, Boyd and Rubin describe a student critical turn as a student turn of talk that was at least 10 seconds in length that built upon a previous comment. These turns of talk could come after either a teacher or student comment. For example, one student critical turn from a discussion of a picture book about an arctic fox in a 4th and 5th grade English learner classroom (Boyd & Rubin, 2002) proceeded as follows:

> Teacher: What do you think Steve? You had your hand up.
>
> Steve: I was thinking about the other question you did, about leaving a print in the snow.
>
> Teacher: Okay, what did you think about that?
>
> Steve: I think his um like when he's walking he's uses his tail going like that (motions) and the snow covers his print. I mean the snow after his tail is going like that
>
> Teacher: OK, so he is brushing away the print.

Rather than focusing on the consistency of these turns of talk, Boyd and Rubin focused their research more closely on the turns of talk that directly preceded SCTs. Specifically, Boyd and Rubin's research has found that extended student talk most often resulted from teacher questions that were contingent upon previous student comments, regardless of whether these were open-ended "authentic questions" or more directed "display questions" (Boyd & Rubin, 2006).

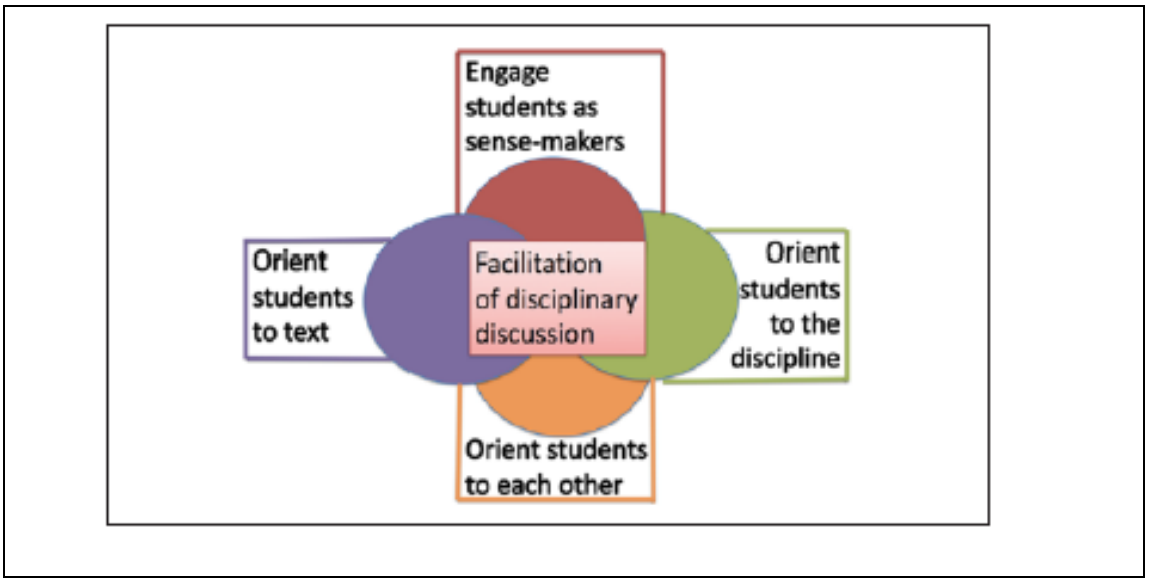
Research has also looked at how teachers can support students in engaging with others' ideas in high school literacy. In a study of a 10th grade English classroom, Sherry (2014) first worked to identify moments of collaborative disagreement between students, which he defined as moments in which "a [discussion] participant repeated what another speaker said

in order to challenge their perspective" (Sherry, 2014). He then focused on what the teacher did in the moments leading up to these examples of students engaging with others' ideas. Sherry found that the teacher used two practices -- indirect challenges and provocative paraphrases – in ways that mirrored "The Dozens," a culturally-specific African American language practice used to connect and contest a perspective (Sherry, 2014). Sherry's work found that the teacher's use of these practices may have supported students in referencing others' ideas and revising their own ideas. The research that I propose intends to add to this nascent literature on how teachers work to engage students with one another's ideas in subject areas outside of mathematics.

Facilitating discussion in social studies. Researchers in social studies education have long bemoaned the predominance of lecture and book-work in social studies classrooms (e.g., Bain, 2006). The body of research that focuses on classrooms where discourse *is* valued largely focuses on classroom discussion, or extended classroom talk where students build upon one another's ideas. This research largely finds positive learning outcomes for students who regularly participate in discussions in social studies. Hess and Posselt (2002) found that high school student who had access to controversial public issues discussions improved their participation in these discussions as measured by videotaped classroom observation and pre- and post- intervention surveys. More than a decade later, Hess and McAvoy (2015) found that students who had access to controversial issues discussions were more likely to vote, follow the news, and participate in political discussions. Although these findings largely concern democratic and civic outcomes, research in history education has recently seen an increased focus on the relationship between discussion and student learning. Reisman (2012b) used a quasi-experimental design to study a curricular intervention using

the "document-based lesson," a form of historical inquiry that features whole class discussion as one of its three instructional formats, along with presentation of relevant background knowledge and small group work focused on understanding historical texts. Reisman found that student exposed to the "Reading Like a Historian" curriculum through document-based lessons (Wineburg, Martin & Monte-Sano, 2012) outperformed their peers on measures of historical reading, general reasoning, factual recall, and generic reading comprehension (Reisman, 2012b). However, in six months of observations across five intervention classrooms, Reisman (2015) identified only nine discussions that met her strict criteria for a *disciplinary* historical discussion, so it is unclear whether or how much historical discussions contributed to student learning gains. Therefore, evidence that discussion promotes students' historical understanding in history classrooms remains thin. Encouragingly, however, some research suggests that teachers can learn to lead historical discussions given appropriate scaffolds. Through studying teacher candidates' attempts at facilitating historical discussion in multiple universities, Reisman and colleagues developed a framework for facilitating historical discussions that the authors theorized would be supportive of teacher candidates' ability to do this work (Reisman et al., 2017). In subsequent work, Reisman and colleagues found that after using this framework, secondary teacher candidates showed signs of orienting students to each other's ideas and to the discipline more often when presented with this framework.

Figure 9. Framework for facilitating historical discussions, from Reisman et al., 2017, p. 2.



Rather than investigating the relationship between discussion and student learning, scholarly work on discussion in social studies – much of which is conceptual in nature -- largely explores the idea that discussion can further democratic outcomes. For example, Parker (2003) shares examples of classroom discussion in explaining the role of discussion among diverse publics for developing democracy. He centrally features Paley's account of a discussion among her kindergarten student about whether students should be able to say to each other "You can't play" (Paley, 1992). Teaching in a classroom of kindergarten students, Paley describes the varied student responses to her proposal and the decision-making process that her students engaged in. Parker cites this kindergarten classroom as a prime example of deliberative democracy at work. In other work, Parker uses high school classroom excerpts of discussions on important themes such as adulthood and the morality of physician-assisted suicide to illustrate the value of learning to listen to strangers through classroom discussion (Parker, 2010). In *Controversy in the Classroom,* Hess (2009) relates anecdotes of three teachers who employ significantly different practices for discussion (e.g., whether to assess students on their participation), and argues that

each approach leads to successful discussions. This set of work identifies aspects of discussion facilitation by teachers and suggests that discussion in social studies has potential to support learning, though further research would more clearly establish this link.

Research on the role of teachers in supporting productive discussions in social studies has often focused on the purpose and structure of discussion. Parker and Hess routinely distinguish between two discussion structures that hold different purposes – seminars and deliberations. Seminars, Parker writes, are intended to help student reach an enlarged understanding of text, whereas deliberations ask students to reach a collective decision on what to do about a public issue (Parker, 2006). Empirical research from these scholars has largely focused on deliberation. Based on a study of 1,001 students across 35 teachers from 21 Midwestern high schools, McAvoy and Hess (2013) list four characteristics of teachers who build open classroom climates and successfully engage students in discussion. These best practices include a) consideration of controversial topics, b) student preparation, c) broad student participation, and d) student talking to each other and not their teacher for at least part of the discussion, the last of which is of particular note to this study. Interviews with teachers included in the study also found that teachers who led deliberations about controversial issues did so in highly varied ways. Though McAvoy and Hess' research represented a significant step towards providing an empirical base for the relationship between discussion and democratic aims, research in this area has only just begun.

Finally, it is important to note that social studies researchers who do study discussion argue that discussion is both a *method* and an *outcome* of instruction (Parker & Hess, 2001; Parker, 2010). In other words, the purpose of discussion is not only to learn the content being discussed, but also to learn the skills of participating in discussion. Experts in deliberative

democracy echo this emphasis on the importance of helping students learn to participate in discussions (Gutmann, 1987; Young, 2000). I lean upon the work of these two sets of scholars in adopting a dual focus on engaging in discussions as both an avenue towards learning and a worthwhile aim of schooling.

Studying Opportunities to Learn

One of the leading research questions of this dissertation asks how students' engagement with others' ideas supports students' opportunities to learn. As a construct in educational research, "opportunities to learn" (OTL) has evolved over the past five decades. Broadly speaking, opportunities to learn is now defined as "the opportunities which schools provide for students to learn what is expected of them" (Herman, Klein & Abedi, 2000). In a synthesis of research on opportunities to learn, Kurz (2011) identified three "instructional dimensions" of opportunities to learn; the amount of time the teacher devotes to teaching the intended curriculum, the content that the teacher teaches, and the quality of the instruction. The focus of this paper on how students engage with others' ideas and how a teacher supported this work centrally focuses on the quality of instruction dimension of opportunities to learn identified by Kurz (2011). Researchers have noted that research on opportunities to learn would be improved by a focus on all three dimensions of OTL, though the scope of this study did not allow for me to look at dimensions of OTL outside the quality of instruction.

Despite the emergence of opportunities to learn as a construct in the educational literature, there exist significant criticisms of the use of opportunities to learn as a construct. One of the most significant concerns the theories of learning that undergird the construct of opportunities to learn. Traditional conceptions of OTL largely situate knowledge and learning in the brain or mind. Yet situated and sociocultural viewpoints see learning and knowledge as the

product of the relationship between minds, bodies, and the environments that the learner interacts with (Gee, 2008). From this sociocultural perspective, learning environments provide affordances that may stimulate learning, yet each learner may not be able to transform the affordances from every environment into learning. This perspective suggests that learners have not necessarily had the same opportunities to learn because they were exposed to the same information or content, and that the environment in which learners are situated may influence students' opportunities to learn (Gee 2008). As a researcher who holds a sociocognitive theory of learning, take seriously the way that environments influence learning. This is reflected in my conceptual framework [Figure 11, p. 53]. Yet, the body of educational research reviewed here also suggests that classroom discourse provides students with opportunities to learn within a variety of environments and classroom contexts. Therefore, despite critiques raised in the educational literature, I choose to use opportunities to learn as a way to understand how engaging with others' ideas affected students because of the importance of examining the influence of engaging with others' ideas on students' classroom experiences.

Conclusion

The research presented in this literature review suggests that engaging with students' ideas is an important area for future research. This literature documents that argumentation is both an important disciplinary practice across disciplines and one way that experts in different disciplines engage with others' ideas and therefore foundational to each of the subject areas in this study, that engagement in others' ideas can advance learning in each subject matter, and that the teaching practice of facilitating discussion (of which engaging with others' ideas is a part) is associated with meaningful subject-matter learning. Yet important questions remain about how students engage with one another's ideas and do so similarly and differently in each content area,

how students may do so across the day in the context of elementary school, how power and authority may influence students' engagement with others' ideas and how teachers support students in engaging with one another's ideas in each subject area.

In this study, I intend to replicate math education researchers' work on engaging with others' ideas while contributing to the scholarly literature in multiple ways. First, in an effort to conduct multi-disciplinary research which matches the realities of elementary school teaching and learning, I studied three school subjects. These include math, where research on engaging others' ideas has been explored primarily by one research team, and literacy and social studies, where researchers have not yet examined how students engage with each other's ideas directly, but where discourse is highly valued. Second, within these content spaces, I will examine both how students engage with others' ideas and the teaching work that appears to support students' engagement with others' ideas. By viewing engagement with others' ideas with multiple lenses, I hope to provide unique insight into how students engage with each other's ideas and how teachers support them in doing so. My research questions, based on the identified gaps in the scholarly literature, are presented below.

Research Questions

1. During math, literacy, and social studies, how do 5th grade student in one classroom engage with other students' ideas?
    a) What did students discuss when they engaged with others' ideas?
    b) How is students' engagement with others' ideas similar across school subjects?
    c) How does students' engagement with others' ideas differ by school subject?

    d) How is students' engagement with others' ideas shaped by socially-constructed authority?

2. How does students' engagement with others' ideas shape the opportunities that students have to learn content in one 5th grade classroom?
3. How does one 5th grade teacher create classroom conditions that support students' engagement with others' ideas during math, literacy, and social studies?
    a) How does the teacher's understanding of the subject matter influence student' opportunities to engage with other's ideas in that subject matter?
    b) What moves does the teacher make that support student' engagement with others' ideas?

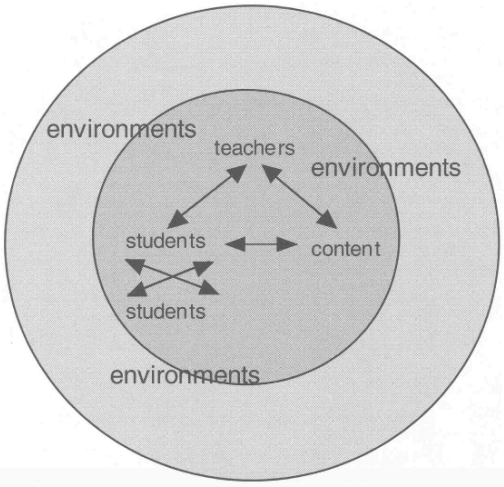
Conceptual Framework

My interest in how students engage with each other's ideas is grounded in sociocognitive theory (Chinn, Anderson, & Wagonner, 2001; Gee, 2001). From this perspective, the thinking of individuals is influenced by shared participation in a community of learners (Lave, 1991). When students engage with each other's ideas, individuals may monitor, revise, and consolidate their thinking (Franke et al., 2015). At the same time, interpersonal interactions in classroom spaces with shared norms govern the discourse and thinking that takes place (Yackel & Cobb, 1996). Furthermore, the heterogeneity of identities, perspectives, and knowledge in a community of learners is an asset that influences the learning opportunities available to students.

In order to study my phenomena of interest, I borrow from the instructional triangle as conceptualized by Cohen, Raudenbush and Ball (2003). In their model, Cohen, Raudenbush and Ball use an instructional triangle to communicate the idea that instruction is interaction – between students, teachers, and content – situated in larger policy and community environments

(see Figure 10). They also use their triangle to argue to a policy audience that *social* resources, such as students' ideas and the way teachers elicit them, are just as important to improving teaching and learning as traditional resources such as school funding, curriculum, and teacher qualifications. This model is consistent with my view that learning is a social process where community and context influence the meaning that individuals construct for themselves (Cobb, 1994; Hatano, 1993; Yackel & Cobb, 1996). In focusing on students' engagement with one another's ideas, I echo Cohen, Raudenbush and Ball (2003) by taking the stance that interaction is a crucial component of both teaching and learning. This stance is supported by educational research reviewed in the previous section. Therefore, the Cohen, Raudenbush and Ball (2003) framework is an appropriate basis for the way I conceptualize my research.

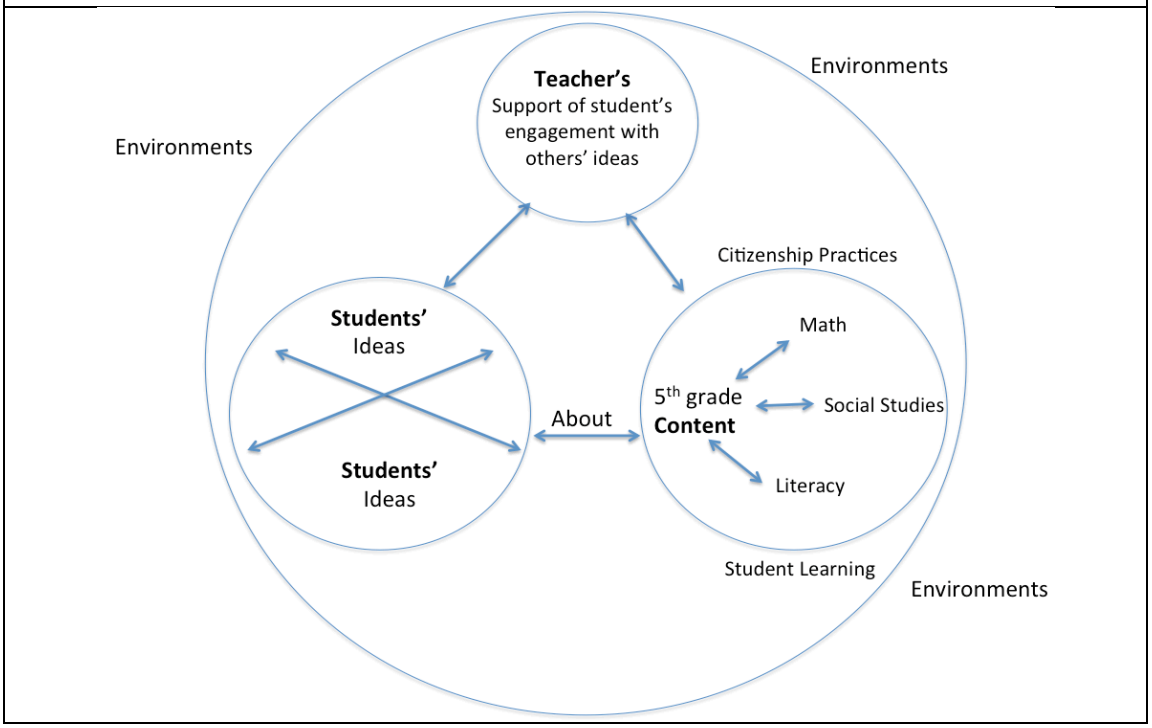
Figure 10. Instructional triangle from Cohen, Raudenbush & Ball, 2003, p. 124.



My research builds on the work of Cohen, Raudenbush and Ball (2003) by zooming in on the ways in which students interact with others' ideas (see the crisscrossed arrows with "students" above in the lower left section). Therefore, I place particular emphasis on the

intersecting arrows that represent student-to-student interactions in the Cohen, Raudenbush, and Ball instructional triangle. I also specify "content" by focusing on multiple school subjects and citizenship practices related to engaging with others' ideas in those content areas. I present my conceptual framework in a section below. This framework (see Figure 11) borrows heavily from the instructional triangle outlined by Cohen, Raudenbush, and Ball (2003). I do not see these frameworks as contradictory; rather, I see my conceptual framework as a zoomed-in, further specified conceptualization of the context in which students engage with one another's ideas in elementary school.

Figure 11. *Conceptual Framework for 5th Grade Students' Engagement with Others' Ideas*



A crucial component of my conceptual framework is the crossing arrows between the labels "students' ideas." This represents a stance that underlies my research: that students have knowledge and ideas that are worthy of using as resources to aid other students' learning (Ball, 1993; Lampert, 2001). The crossing arrows are particularly important to my conceptualization,

where they represent students' engagement with each other's thinking. Though I recognize that students are more than ideas and their identities and interests matter, the focus of my work is on students' thinking and how that thinking interacts with other students' thinking.

The "content" segment of my instructional framework specifies three subject areas where students may engage with one another's ideas in the upper elementary school classroom. In this research, I focus on how students engage with one another's ideas in literacy, math, and social studies. There are many forms of content in elementary school classrooms -- including science, socio-emotional learning, art, and more -- that are beyond the purview of this study. Furthermore, though I believe that this type of work will lead to improved student learning and citizenship outcomes, I do not focus on outcomes such as student learning in this study. Instead, I focus on what is involved in students' engagement with others' ideas across subject areas. I view students' ability to engage with one another's ideas as a citizenship practice, and developing young people into citizens who can engage with one another's ideas is one of the broad-level goals of this work.

The "teacher" component of my conceptual framework narrowly defines the teacher's role as to support students' engagement with one another's ideas. A number of instructional practices are important for teachers in this work, including eliciting student thinking (Franke et al., 2007; 2009), noticing student thinking (Bobbys, Lamb, & Phillip, 2010), responding to student's thinking (Bobbys & Empson, 2015), implementing norms of disciplinary discourse (Kazemi & Stipek, 2001; Yackel & Cobb, 1996) and facilitating discourse (Ball, 1993; Cazden, 2001). The choice of the word "support" for how teachers can help students engage with others' ideas stems from research showing that teachers' moves beyond initial invitations of thinking are particularly important for helping students engage others' ideas in sophisticated ways (Franke et

al., 2015). I recognize that the work of teaching goes far beyond supporting students' engagement with one another's ideas. For the purposes of this study, I examine only a narrow component of what teachers do on a daily basis.

Finally, I will not be focusing on the "environments" that are a part of the instructional triangle. I recognize that the teaching and learning that happens in my school site is influenced by a multitude of environments that surround the classroom context that I spent time in. Instead, I focus my view on interactions between and among students in order to better understand the phenomenon of engaging with others ideas.

CHAPTER III

Research Methods and Design

In this study, I employ case study methodology (Patton, 2015; Yin, 2004). Case study methodology is a method of inquiry in which the researcher "examines in depth a program, event, activity, process, or one or more individuals" (Merriam, 1995). I use case study because my research questions center on *how* students engage with one another's ideas and how teachers support this work— questions that require in-depth involvement in classrooms where students engage with others' ideas. Yin (2004) writes that the strength of the case study method is the way it enables one to "examine, in-depth a 'case' in 'real-life' context." In my research, I share a case of one classroom where students regularly engaged with others' ideas, and where a teacher often supported this work. My conceptual framework and research questions pose that instructional interactions are crucial to learning, and these interactions can only be understood within the real-life context of my focal classroom.

Units of Analysis

Patton (2015, p. 260-262) emphasizes that the many definitions of case study research share a common emphasis on specifying one's unit(s) of analysis. Specifying one's unit of analysis, Patton continues, involves placing a boundary around one's phenomenon of interest, a process that is "both inevitably arbitrary and fundamentally critical because that boundary-setting process determines what the case is and therefore the focus of inquiry." I conducted my research in one upper elementary school classroom, which will be my unit of analysis. Patton (2015, p. 262) also notes that focusing one's unit of analysis on a social organization lends itself

to observation and descriptions focused directly on that unit; therefore, I used observation and description extensively in order to answer my research questions.

School Context

This research was conducted in an elementary school in a metropolitan area in the Northeast. Sullivan Elementary School[1] is one of a number of elementary schools in a mid-sized suburb. The school, which enrolls 402 student and has three general education classrooms at each grade level, is predominantly middle- and upper-middle class, with 6% of students qualifying for free and reduced lunch. The school serves 70% White students, many of whom are of Italian and Irish descent, 15% Asian students, 6% Hispanic/Latino students, and less than 5% Black and biracial students. Twelve percent of students speak a first language other than English, including a few students each year who entered the school mid-year after moving to the United States from other countries. Fourteen percent of students at Sullivan are on Individualized Education Plans (IEPs), and these school-designed plans intend to meet students' needs in a variety of ways. Some students on individualized education plans are part of the "structured learning community" (SLC) program for students on the autism spectrum whose needs cannot be met in the general education classroom. Students from across the district attend Sullivan for its expertise in this area of work. Students from both the general education and SLC programs attend school in a renovated school building where construction was finished in the summer before this study. The school sits on the top of a hill surrounded by bungalow-style houses. Most students walk to school, while some students -- particularly those in the SLC program – arrive by bus.

[1] All names are pseudonyms in order to protect the privacy of research participants.

Research Participants

Teacher participant. This study focuses on the classroom of Ms. Kanzer. Ms. Kanzer, a 5th grade teacher at Sullivan, is a white female in her mid-40s who is in her 19th year of teaching. Ms. Kanzer has taught 3rd through 5th grades at both public and private schools. In initial visits to her classroom, Ms. Kanzer emphasized that she was working on discourse in her classroom, and often put students in small groups to work together. Through frequent observations in her classroom for three months leading up to data collection, I affirmed that Ms. Kanzer fosters student engagement with each other's ideas on a regular basis, making her classroom an ideal setting for studying my phenomenon of interest.

Teacher selection process. I chose to conduct my research in the classroom of Ms. Kanzer through a process of both convenience and purposeful sampling. In the spring and summer of 2017, I emailed a number of school-based colleagues in the local area to ask them if they knew any "great teachers who have whole class discussions with their students with some frequency, in multiple subjects" who might be willing to host a researcher in the 2017-2018 school year (Personal Communication, 2017). I did not specify other teacher criteria for choosing teachers, such as objective measures of expertise. I pursued all recommendations, though not all teachers got back to me.

In April 2017, I visited the classroom of Ms. Kanzer. Ms. Kanzer was recommended to me by a personal contact who is the math coach at the Sullivan School. I observed Ms. Kanzer during a math lesson where students worked collaboratively in small groups then came together for a short whole class discussion at the end of the lesson. I noticed that students came up to the board to present solutions, and were encouraged to respond to one another's ideas. I continued to spend time in Ms. Kanzer's class in Fall 2017, and found that opportunities for students to

engage with one another's ideas were even greater than I imagined. I witnessed a student-led whole-class book discussion, and math work that oriented students towards coming up with a solution as a partnership then comparing their work to that of other groups. Students also reflected on their partner work, a practice that seemed like it might support students in engaging with others' ideas. Ms. Kanzer's class quickly emerged as an ideal place to study my phenomenon of interest.

It is important to note that Ms. Kanzer's classroom was not the only classroom I visited while exploring potential dissertation sites. I spent about three months in a 1st grade classroom in small city in the Midwest studying students' discussions in Fall 2016, observations which served as a launching point for my dissertation proposal. I found that although the teacher held whole class discussions about read aloud texts, students most often worked through a book of problems during math, and did not have the opportunity to engage with other's ideas. On the same day as I visited Ms. Kanzer's classroom for the first time, I visited another 5th grade teacher at Sullivan school. The second 5th grade teacher held a number talk discussion when I visited and expressed that she believed discourse is crucial to mathematics learning, but I later learned she holds a halftime position focused only on science and mathematics. Studying in this teacher's classroom would have precluded me from studying student' engagement in others' ideas in literacy and social studies. Finally, I visited a 3rd grade teacher's classroom in another town outside the same metropolitan area about twice per week during September and October, 2017. I encountered this teacher through the recommendation of an elementary education faculty member at a local university. Over the course of these visits, I determined that while the teacher intended to provide opportunities for discourse, the culture of the school, the curriculum, and the teacher's practice made it so that these opportunities were fewer than he intended. These visits confirmed

to me that Ms. Kanzer's classroom was an ideal site for my research because of the many opportunities she provided for students to engage in one another's ideas. Therefore, I engaged in purposeful sampling (Seidman, 1991) in selecting Ms. Kanzer as an attempt to provide images of how students might engage with others' ideas, and how a teacher can support this work.

Student participants. The student participants in this study were all students whose parents or guardians provided consent for participation in the focal classroom. After explaining the study to students and providing information that Ms. Kanzer communicated to the students' parents, 21 of 22 students agreed to participate in data collection for the study. I requested consent from all students in the classroom out of a desire to capture as many examples as possible of students engaging with others' ideas, as any student in the classroom may engage with another student's idea during whole class or small group discourse. The students in the classroom generally reflect the population of students in this school.

In addition to recruiting 21 of 22 students in the classroom as student participants, I chose five students as focal students for the study. Focal students participated in the study like student participants with two important additions. First, I interviewed focal students multiple times informally over the course of data collection, and once formally at the end of data collection. Second, I gave these five students audio recorders, and recorded more of their small group conversations than other students.

Student selection process. Student participants were selected by virtue of being a member of Ms. Kanzer's classroom. Focal students were selected based on consultation with Ms. Kanzer. Criteria considered when discussing focal student choice with Ms. Kanzer included race and ethnicity, socioeconomic status, academic performance, and the frequency with which students participated in whole class discussions. I eventually chose focal students that were

diverse along each of these selection criteria. Table 2 displays demographic data for all students in the study.

Table 2. Demographic Data for Student Participants (all names are pseudonyms)

Name	Gender	Race/Ethnicity
Bobby*	M	White
Alonso*	M	Latino
Calvin*	M	White
Andrea*	F	Asian
Rebecca*	F	White
Amariah	F	White
Amelia	F	White
Cassie	F	White
Dan	M	White
Gio	M	White
Haley	F	White
Iris	F	White
Maggie	F	White
Oscar	M	White
Randy	M	White
Rose	F	White
Sorah	F	Asian
Tara	F	White
Tim	M	Latino

Vince	M	White
Note: * signifies focal student		

Data Sources and Data Collection

Data sources. Table 3 outlines the data sources that were used to answer each research question in this study. The predominant data source for this study is field notes from classroom observations and audio recordings to support field notes. These data sources are appropriate for my research because they capture the instructional interactions that are crucial to understanding how students engage with others' ideas. I included additional data sources to help triangulate my observations so that I gain a more secure understanding of my phenomena of interest (Maxwell, 2013). These supplementary data sources included classroom artifacts, student work, informal student interviews with focal student between activities, formal activities with students, and interviews with the teacher before and after the completion of data collection. I view teacher interviews as a supplementary data source because I privilege how the teacher *enacts* support of students in engaging with one another's ideas over the way they think about supporting students' engagement with others' ideas. Below in Table 3, I provide further information about how each data source helped me answer my research questions

Table 3. Research questions and corresponding data sources and analysis

Research Question(s)	*Data Sources**	*Data Analysis*
RQ1: During mathematics, literacy, and social studies, how do 5th grade students in one classroom engage with other students' ideas? • *RQ1*a: What did students discuss when they engaged with others' ideas? • *RQ1b:* How is students'	- Detailed field notes - Recordings of whole class talk - Recordings of all partner and small group talk - Selected student work	1. Determined when classroom talk met criteria for a discussions where students engage with others' ideas. Transcribe these discussions. 2. Used grounded

engagement with others' ideas similar across school subjects? • *RQ1c:* How does students' engagement others' ideas differ by school subject? • *RQ1d:* How is students' engagement with others' ideas shaped by socially-constructed authority?	- Informal student interviews with focal student between activities - Classroom artifacts such as Powerpoints, charts, and handouts	theory to look for initial patterns in how student engage with each other's ideas within each school subject. Then looked for patterns across school subjects – what is similar? What is different? 3. Completed a second pass at the data with an eye to discussions where sociocognitive conflict (Buchs et al., 2004) and socially-constructed authority may be at play. 4. Developed a coding scheme for how students engage with others' ideas. Used Dedoose software to code patterns in talk.
RQ2: How does students' engagement with others' ideas shape the opportunities that students have to learn content in one 5th grade classroom?	- Detailed field notes - Recordings of whole class talk - Recordings of all partner and small group talk for five focal student (borrowing from Franke et al., 2015) - Selected student work	1. Grouped discussions by school subject 2. Used grounded theory to develop ideas and identify patterns about what students had the opportunity to learn during these discussions. 3. Searched for disconfirming evidence of these patterns in order to modify and ensure accuracy of findings
RQ3: How does one 5th grade	- Detailed field notes	1. Focused on

teacher create classroom conditions that support students' engagement with others' ideas during math, literacy, and social studies? • *RQ3a:* How does the teacher's understanding of the subject matter influence students' opportunities to engage with others' ideas in that subject matter? • *RQ3b:* What moves does the teacher make that support students' engagement with others' ideas?	- Recordings of whole class talk - Recordings of teacher interaction with partner and small group talk - Interviews with teachers before and after data collection (Early December 2017, February 2018) - Classroom artifacts such as Powerpoints, charts and handouts	discussions where students engaged with others' ideas, identified in coding for research question #1. 2. Used grounded theory to look for initial patterns in how teachers support student in engaging with each other's ideas within each school subject and within each class. Then, consolidated these into focused codes. 3. Developed a coding scheme for how the teacher supports engagement with others' ideas. Also looked for evidence that disconfirmed initial ideas about how teachers support engagement with others' ideas.
*These data sources were collected daily during math, literacy and social studies instruction in January and February 2018.		

Classroom observations—field notes and audio recordings. Repeated and extended classroom observations helped me understand *how* students engage with one another's ideas and how the teacher supported this work, and also provided insight into the way that engaging with others' ideas shaped students' opportunities to learn subject-matter content. Therefore, classroom observations were an essential data source for helping me answer all three of my research

questions. Over the course of seven weeks of data collection, I spent an average of four days per week for 5 hours per day in the focal classroom. This led to a total of 137 hours of observation.

Based on my observations in Fall 2017, I expected to see both math and literacy every day that I was in the classroom, and social studies on a more occasional basis. In actuality, the teacher chose not teach social studies during the seven weeks I collected data. Instead, the teacher elected to teach science and to teach a series of lessons that would help students listen to their peers. In place of social studies, I elected to collect data during sessions that focused on listening because of the applicability of listening to my own study of engaging with others' ideas. I did not collect data during science or other times of the day, such as morning meeting, that were not related to one of the focal subject matters in my study.

During class time in my focal subject areas, I audio recorded all whole-group time and all small-group conversations that the five focal students participated in. When one of the five focal students partnered with the student who did not agree to participate in the study, I placed their audio recorder with another small group. Likewise, when a focal student was absent, I placed their audio recorder with another small group. I typically used two recorders to record whole-class talk to provide multiple angles, then circulated at the beginning of small group work in order to pass out audio recorders and begin recording. I paused and collected recorders after periods of whole group or small group talk.

In addition to audio recording, I took jottings (Emerson, Fretz & Shaw, 2011) on whole group and small group talk. My jottings (see Appendix H) kept track of both what students said and what the teachers said, both of which were important to answering my research questions. I made sure to spend more time on moments where students directed comments towards one another, paying less attention to times when students worked independently next to their small

group. In order to gain a detailed understanding of how each focal student engaged with others' ideas, I spent one week sitting next each of the five focal students during small group work, before varying which small groups I spent time with during the final two weeks of data collection. Finally, I recorded the broad picture of what I had observed each day in a summary notes page (see Appendix D).

During data collection I assumed the role of participant observer. I explained my research-oriented purposes in the classroom to the students from the outset, but also strove to create relationships with the students and teacher through authentic engagement and interest in their work. I also engaged in informal conversations with the students throughout the school day. That said, I did not position myself as a teacher. Upon students' request, I sometimes provided brief guidance, but did not offer extended help to individual students or groups of students that lasted beyond a few minutes. In sum, I positioned myself as an adult who was engaged in the life of the classroom, but I refrained from involvement that might have impacted how students engaged with others' ideas.

Classroom artifacts. I collected a number of classroom artifacts during data collection. These included a) pictures of the class whiteboard after discussion, on which the students or teacher recorded ideas, b) charts made by the teacher after a lesson containing student ideas, and c) lesson plans and curriculum documents. I used classroom artifacts as a supplementary data source that primarily provided insight into my third research question, how teachers supported students in engaging with others' ideas.

I relied heavily on the photo function of my mobile phone for collecting copies of these classroom artifacts. I scanned and uploaded a number of these documents into Dedoose data analysis software. As suggested by Bowen (2009), analysis of classroom artifacts that proved

"contradictory rather than corrobatory," prompted me to re-investigate my initial theories. Therefore, collections of classroom artifacts provided an additional data source that contributed to the overall validity of the study.

Student work and assessments. I collected student work as another supplementary data source. Student work was particularly important to collect in order to answer my second research question about the opportunities to learn presented by engaging in others' ideas. I did not collect all student work from the seven weeks I spent in the classroom. Instead, I collected student work from discussions where students engaged with others' ideas, figuring that this student work would be particularly pertinent to my research questions. At times, I collected all student work on a given task or problem, whereas at other times I collected student work that was influential in whole group or small group discussion.

Teacher Interviews. I conducted both informal and formal interviews with the teacher in the study. These interviews were a primary source of data for my third research question about how the teacher supported engagement with others' ideas, and a supplementary data source for my first two research questions. I conducted three formal interviews with Ms. Kanzer. The first interview, which took place before data collection began, was intended to help me understand how the teacher thinks about the central concept in the study, engaging with others' ideas. The second formal interview, during data collection, focused on the teacher's understanding of subject matter and her curricular decisions. In the third and final interview, conducted after data collection, I asked the teacher to analyze another teacher's discussion to better understand her thoughts about discussion. I also conducted informal interviews every two weeks after school, where I asked the teacher to reflect on the discussions happening in her classroom. I conducted

these interviews in order to help me understand the choices I saw the teacher making during observations. I include my teacher interview protocols in Appendix D.

Student Interviews. I conducted both informal and formal interviews with the student in the study. I conducted informal, unstructured interviews with all 22 participating students between activities. These interviews primarily consisted of one or two questions about other students' ideas or a discussion that had recently concluded. The questions for these interviews emerged from the day's work, and asked only one or two questions at a time so as not to interfere with students' academic work. These interviews helped me understand how students *thought* about others' ideas, which is related to my first research question about how student engage with others' ideas. I include a protocol for these interviews in Appendix F.

After the two-month data collection period was complete, I conducted one formal, structured interview with each of the five focal students. This interview was intended to gather more information about the ways in which socially-constructed authority shaped students' engagement with others' ideas. These interviews were conducted in the hallway outside the classroom of interest in order to help make the student as comfortable as possible. These interviews included six questions per student and lasted between five and ten minutes.

Data Analysis

Data analysis methodology. I used grounded theory methodology (Charmaz, 2014) in order to analyze the data that I collected for this study. Grounded theory, according to Charmaz (2014), consists of "systematic, yet flexible guidelines for analyzing qualitative data to construct theories 'grounded' in the data themselves" (p. 2). Grounded theory is particularly useful for sifting through large amounts of qualitative data, making it a fitting approach to analyzing the many audio recordings, sets of field notes, and classroom artifacts that I collected as data for this

study. Grounded theory is an appropriate lens for analyzing the data collected in this study because I attempt to explain how students engage with others' ideas. In other words, the goal of this study is to build theory that researchers and teachers can use to study students' engagement with others' ideas. This matches the intended result of grounded theory, which Charmaz (2014) describes as research that "explains the studied process in new theoretical terms." Charmaz (2014) also emphasizes how grounded theory methodology involves an iterative process between composing memos and coding data (p.11), a process I use in my research and that I describe below.

Field notes. During classroom activities, I took jottings (Emerson, Fretz, & Shaw, 2011) during literacy, mathematics and listening, my focal instructional periods. These jottings were primarily short-hand, low-inference notes about what was happening in each of my focal subject matters. Another source of data that helped me construct field notes were classroom audio recordings. I listened to recordings of small group and whole group discussions during free periods and after school. While listening to these conversations, I flagged the timestamps where students participated in discussions or seemed to engage with others' ideas. I then listened to these sections again in order to fill in my jottings with more detail. Then, in the evenings, I turned my jottings into ethnographic field notes. Appendix H contains an example of the jottings and field notes that I composed during this study.

Memos. At the end of each week, I composed memos that both catalogued and questioned my initial interpretations based on the week of data collection. The aim of these memos was to connect what I had seen in the classroom to the research questions I posed at the outset of the study. Composing these memos included examining particularly illuminating instances of students' engagement with others' ideas. Classroom artifacts such as student work

also served as data points that I referenced in my memos as confirming or disconfirming evidence of emerging trends.

Defining terms. After spending a number of months in the classroom, I stepped back for a few months after leaving the field site in order to refine my understanding of what it meant to engage with others' ideas in Ms. Kanzer's classroom. In order to do this, I first listened to and transcribed a number of audio recordings, and sorted these recordings into discussions where students did and did not engage with others' ideas. I then highlighted key sections from these discussions and worked to understand what these sections had in common. Eventually, I wrote an extended memo that described my conception for how students engaged with others' ideas, including a succinct definition of engaging with others' ideas.

In this study, I define engaging with others' ideas as *classroom talk in which students respond or refer to others' ideas about subject matter content.* In order to begin more systematic data analysis for this study, it is important that I define three component parts of this definition: *classroom talk*, *responding and referring,* and *ideas about subject matter content*. In the paragraphs below, I explain how I define these component parts of EwOI in order to be as clear as possible about what I mean by engaging with others' ideas. In the findings, I analyze two discussions in depth to further illustrate what it meant to engage with others' ideas during math and literacy lessons in Ms. Kanzer's classroom.

Classroom talk. I define *classroom talk* as talk that occurs during regularly scheduled classroom time. This talk may occur in whole group, small group, or partner settings. Though engaging with others' ideas could occur outside the classroom walls or virtually, the data set for this study only includes in-person communication within the classroom.

For the purposes of this study, I focus on classroom talk that is part of a discussion, which I define as classroom talk about a single topic that lasts at least two minutes. Research on classroom discussion has defined discussions as lasting anywhere between 30 seconds (Nystrand & Gamoran, 2007) and four minutes (Reisman, 2015). I chose two minutes as a middle road between these two extremes. Based on these criteria, I identified 49 discussions and analyzed how students engaged with others' ideas during each of these discussions. As a result of this process, I analyzed how students engaged with others' ideas during 49 discussions.

One further term I use to refer to classroom talk is an *episode*. I define episodes as classroom talk on one topic that consists of at least five turns of talk. In defining episodes in this way, I draw from Boyd and Rubin (2002), who identified "topical episodes," and Schleppenbach and colleagues (2007), who defined episodes as lasting three or more turns of talk. I chose to define episodes as at least five turns of talk based on analysis of my data and experience in the classroom of Ms. Kanzer. I view episodes as smaller units of talk than a discussion. In other words, classroom discussions may be composed of one or many episodes of talk. I segmented discussions into episodes after noticing that students discussed multiple ideas in some discussions while remaining focused on one idea in other discussions. This allowed me to observe further differences between how students engaged with others' ideas in mathematics and literacy.

Responding and referring. The clearest examples of students engaging with others' ideas occurred when students responded or referred to others' ideas. Some examples of students responding or referring to others' ideas from data collected as part of this study are below.

Table 4. Examples of students engaging with others' ideas.

Responding to Others' Ideas	**Referring to Others' Ideas**
• Student A: "I think you made a pretty good picture to show what you were	• Student A: "At first I didn't get what Tara was saying at all, but now I kind of get it."

thinking, but you could have used addition instead of subtraction." • Student B: "I kind of agree with you, because the author was trying to show the character was very scared" • Student C: "I think your strategy is a little bit repetitive because you just keep dividing and dividing."	• Student B: "It's kind of like what Vince said last week, the larger the denominator the smaller the fraction". • Student C: "My idea is kind of like Amariah's idea because I think Bud is very lonely"

In each of these examples of responding to other students' ideas, the student speaks directly to a student who has explained his or her thinking about a problem or concept in mathematics, literacy or social studies, which meets my criteria of an idea. References to other student ideas happen in the third person. References to others' ideas happened almost exclusively during whole class talk in my research, though they could certainly happen in small group talk as well.

Ideas about subject matter content. In this study, I exclusively examine how students engage with others' *ideas about subject matter content*. I view the ideas about subject matter content that students hear, consider, and respond to as a crucial part of the process of learning in formal schooling. It is conceivable that students might hear and respond to what other students say about their peers, their family, their interests or hobbies, and more. This may or may not affect how students engage with others' ideas about subject matter content. Nonetheless, I view learning subject matter content as a central part of schooling, and therefore specify that engaging with others' ideas is centrally concerned with ideas about subject matter content. I view students' ideas about subject matter content as a central part of the content itself. In other words, students' ideas about content are part of how content is constructed in the classroom setting.

Studying listening. I recognize that the methods I use in this study only capture how students verbally engage with others' ideas. A crucial aspect of engaging with others' ideas is

listening to and interpreting what others are saying. Unfortunately, the audio recordings and field notes I used for data collection could not help me understand what students were thinking as others shared their ideas. I did try, however, to ask focal students what they thought about discussions after they concluded. I also noticed that students often expressed confusion or asked questions about others' ideas, which I interpreted as active listening and engaging with others' ideas. Future research could focus more directly on students' listening by conducting more extensive interviews with students before, during, and after classroom discussions, or by administering tasks intended to examine if students understood and are able to apply concepts exposed during classroom discussion.

Engaging with others' ideas: a spectrum of sophistication. The coding scheme described above does not distinguish between more and less sophisticated examples of engaging with others' ideas. This is not because these distinctions did not exist. Students often responded to another student by saying "I agree with (student's name) because" before making their own point that was sometimes unrelated to the previous student's comment. Students also engaged with others' ideas tersely and without elaboration. For example, students sometimes said "What? That makes no sense to me" as a way of expressing confusion about other students' ideas.

I made the choice to code these nascent, unsophisticated versions of EwOI as full examples of engaging with others' ideas. I made this choice partly as a way to see the full spectrum of how students engage with others' ideas, as how students engage with others' ideas was a central research question in this study. I also see even underdeveloped examples of engaging with others' ideas as a significant departure from the "IRE" pattern of teacher initiation, student response, and teacher evaluation that characterizes much of the scholarly literature on discussion (e.g., Nystrand & Gamoran, 2007).

Coding data. In the tradition of grounded theory methodology, I approached data collection and analysis simultaneously (Charmaz, 2014). In order to facilitate this, I transcribed audio recordings of classroom observations during the data collection process. I also recognize that a transcription is only an approximation of reality, and that researchers make many choices as they transfer interviews to paper records (Green, Franquiz, & Dixon, 1997).

Using these early transcriptions of audio recordings, field notes, and interviews, I started the process analysis while I was still collecting data in the focal classroom. This way, I could identify early patterns but also have these patterns challenged by my classroom observations. This initial analysis focused on classroom discussions and small group work where students spoke to one another about their work in mathematics or literacy. After leaving the classroom and working to further define my terms, I developed a draft coding scheme grounded in the data and did some initial line-by-line coding with 49 discussions. Then, I used both frequency of initial codes and research literature to determine which line-by-line codes would become focus codes. Afterwards, I began a round of *focused coding* (Charmaz, 2014) in which I synthesized across initial codes and ideas generated from my field notes and analytic memos to find more general patterns. These rounds of analysis were the foundation for the coding scheme that I used to systematically analyze 49 discussion using Dedoose software.

With a coding scheme developed, I then used Dedoose qualitative research software to apply these codes to the transcript of each of the 49 discussions. This coding continued over the course of three months, leading to multiple revisions of my coding scheme that occurred in early Fall 2018 upon consult with my advisor and a peer. In Appendix I, I include a table with the codes I used and examples of data where I applied these codes. During this final round of coding, I continued to grapple with theoretical preconceptions that I knew could both enhance and

constrain my view of the data (Charmaz, 2014). In other words, although I had ideas about what was happening in the data, I was open to revising these ideas based on the data I encountered. I paid special attention to data that challenged my developing ideas and hypotheses, and used these data to revise my analysis and my codes and to address challenging or disconfirming data.

Further analysis. After coding data as described above and identifying broad patterns in how students engaged with others' ideas based on this coding, I completed a further round of analysis in order to explore the concept of engaging with others' ideas in greater depth. I embarked on this deeper round of analysis in order to be more precise about what content students had opportunities to learn about through engaging with others' ideas, and in order to facilitate further comparisons between engaging with others' ideas in each subject area. In this round of analysis, I first analyzed two discussions in far greater depth than I had previously. I analyzed what happened each time a student engaged with another students' idea using four specific questions: "What kind of idea is being discussed?", "What is happening during this segment of the discussion?", "How does engagement with others' ideas further this part of the discussion", and "Who is doing what type of intellectual work in this discussion?" After analyzing these two discussions, I analyzed all 49 discussions in order to identify the content discussed and opportunities students had to learn content during these discussions. From this broader survey, I identified patterns in the types of content and opportunities to learn that were raised in discussions in Ms. Kanzer's classroom. I then selected four discussions to analyze that were representative of the patterns I identified. I analyzed these discussions using the four questions listed above in order to provide an in-depth look at a greater set of discussions. These analyses are included in Appendices J, K and L.

Validity

Data collection methods. I situate my research in sociocognitive theory and an interpretivist paradigm (Erickson, 1986; Gage, 1989) out of an understanding that there is no single reality. Instead, reality is constructed between researcher and participants. I recognize that the conclusions in this study will be a result of constantly changing relationships between students, the teacher, and the content that I as the researcher will only somewhat understand. I also embrace the idea that being reflexive is an important part of validity, and that "errors" induced by meaningful research relationships may be part of doing social science that matters (Bent, 2006; Luttrell, 2010). In this research, I intend not to provide definitive answers but to provide one view of how students engage with others' ideas.

I used a number of strategies support the validity of my work (Maxwell, 2012). First, I was present in the focal classroom for over six months, including two months when I was in the classroom on a daily basis. Second, I collected a number of types of data and triangulated this data so as to not rely exclusively on one source of information. Finally, I conducted a member check with the teacher participant about my emerging observations both during data collection in February 2018, and again after the end of data collection in April 2018. Finally, I actively sought discrepant cases in order to prove myself wrong, as probing alternate theories is an important part of ensuring validity in qualitative research (Maxwell, 2012).

There are a number of limitations to this study that are inherent constraints of the type of research I conducted. I conducted a deep investigation into how students engage with others' ideas in one classroom, a depth that limited my ability to analyze the relationships between the classroom and the role of school, community, and political context on what I see inside the classroom. Furthermore, the students and teachers in the classrooms I have chosen are by no means representative of the United States or even their school at large.

Research relationships and subjectivities. The relationships that I formed over the course of this research may have led me to see the classroom in ways that influenced my research. For example, my knowledge of the students may have led me to pick up on interactions between students that would be unremarkable to an observer not familiar with the student in the classroom. At the same time, my relationships may have made me suspect to spurious inferences out of a desire to see the best in student who I know and care about.

Rather than trying to eliminate my positioning as an insider, I sought to examine my subjectivities in an effort to both reduce bias and use my positioning to "attain the special perspective that [subjectivity's] persuasions promise" (Peshkin, 1988). These subjectivities were numerous and often tied to my personal and professional identity. I spent a number of years as a 4th grade classroom teacher in the New York City Public Schools. Therefore, upper elementary school classrooms are familiar places to me, and I have opinions formed through experience and reading about teaching and learning in these spaces. This reading and research has led me to value classroom discourse, and I have spent a lot of time trying to improve my instructional practice in this area. I tried to be open to many variations of how students might engage with one another's ideas, and how I might support this work. Additionally, I believe that elementary school students should have access to rich social studies curriculum, and that they should read a lot of books of their choice rather than one whole-class text over many months. These opinions conflicted with some of the practices I saw in my research site. I managed these opinions and subjectivities by writing down my opinions in a notebook and differentiating these from my jottings about how students engaged with one another's ideas and how the teacher supported this work.

I understand that my presence alone may have shifted the nature of classroom activities, perhaps leading the teacher to provide more opportunities for students to engage with others' ideas. This shift does not compromise my study, since I am interested in *how* students engage with one another's ideas, rather than the frequency with which they do so.

I also recognize my positioning as a White male in an elementary school classroom; while male elementary school teachers are relatively rare, males are overrepresented in administrator and university roles as compared to the largely female teaching force, and often enter classroom spaces for shorter periods and purposes of evaluation rather than performing the day-to-day work of teaching. I recognize that my presence and gender may have influenced the teaching and learning that happens in the classroom and my own perceptions. Finally, the intersection of my gender and racial identities may have left my presence and expertise unquestioned in problematic ways. I managed these subjectivities by deferring to the teacher in the classroom in order to ensure that she retained a position of authority in our research-practice relationship.

Limitations

Inability to isolate the contribution of engaging with others' ideas to students' opportunities to learn content. This study focused on how students engaged with others' ideas. In focusing on this sub-practice of discussion, I was unable to study how other students and teacher practices contributed to students' opportunities to learn. Ideally, future researchers might look more closely at other classroom practices in order to discern the effects of engaging with others' ideas. Alternatively, one might imagine setting up a control trial where some classrooms engage in discussions featuring student-to-student talk, while others do not. With a minimal research budget and ethical issues at stake, this was not possible for this study. Therefore, my

conclusions about the opportunities to learn content provided by engaging with others' ideas are simply a first attempt at identifying opportunities associated with this type of pedagogy.

Challenges of researching social studies in elementary schools. I intended to study math, literacy, and social studies. Although I observed social studies in previous months in the classroom of interest, the teacher did not teach social studies during the months I was present as a researcher in the classroom. Likewise, other classrooms I visited in order to determine a research site also did not teach social studies. With the increasing pressures of standardized testing in literacy and mathematics and even science, this study reflects the difficulty of studying social studies when it is taught in variable amounts in elementary schools.

Ethical challenges in identifying student status and authority. Toward the end of data collection, I interviewed my focal students in the classroom of interest in order to learn more about status and authority in their classroom. I was particularly interested in their ideas about which students' ideas were more valued than others, or even who was more popular socially than other students. Yet I declined to ask students to compare students to one another, or to rank their peers in terms of power or popularity. I made this decision in order to not calcify hierarchies among students by forcing them to be identified. I asked these students a number of other questions to try to understand more about socially-constructed authority in the classroom, but found that students' responses were less telling than authority dynamics I observed in real time.

Limited generalizability of findings. The research for this study was conducted in a fifth-grade classroom in a town immediately on the outskirts of a large U.S. metropolis. Therefore, the findings from this study are difficult to generalize to other populations. The intention of my research, however, was not to conduct research that could be generalizable

across many populations. Instead, I sought to capture a detailed portrait of how students engaged with others' ideas in one classroom

CHAPTER IV

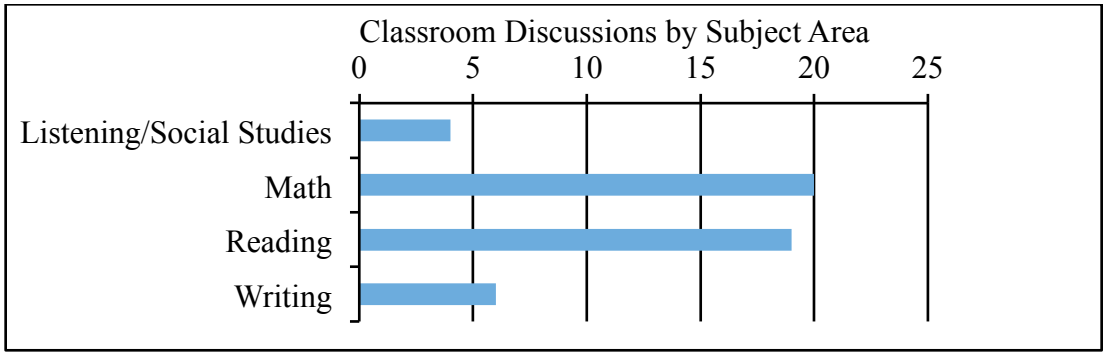
How Students Engaged with Others' Ideas

Classroom Discussions in Ms. Kanzer's Classroom: Background

As described at the outset of this paper, I focused this study on classroom discussion where students engaged with others' ideas. Therefore, I begin my findings by providing background on the discussions that took place in Ms. Kanzer's classroom, as classroom discussions provided the forum through which students engaged with others' ideas. In particular, I focus on the subject areas where these discussions took place in Ms. Kanzer's classroom, and the various types of discussions I observed in each of these subject areas.

Discussions in multiple subject areas. Over the course of seven weeks of data collection in Ms. Kanzer's classroom, discussions occurred most frequently in mathematics and reading (see Figure 12). Discussions in writing and "listening," a subject area that students worked on with the help of an educational consultant, occurred less frequently. Each of these discussions lasted at least two minutes, and no discussions crossed subject matter lines (for example, discussions of mathematics and reading at the same time.)

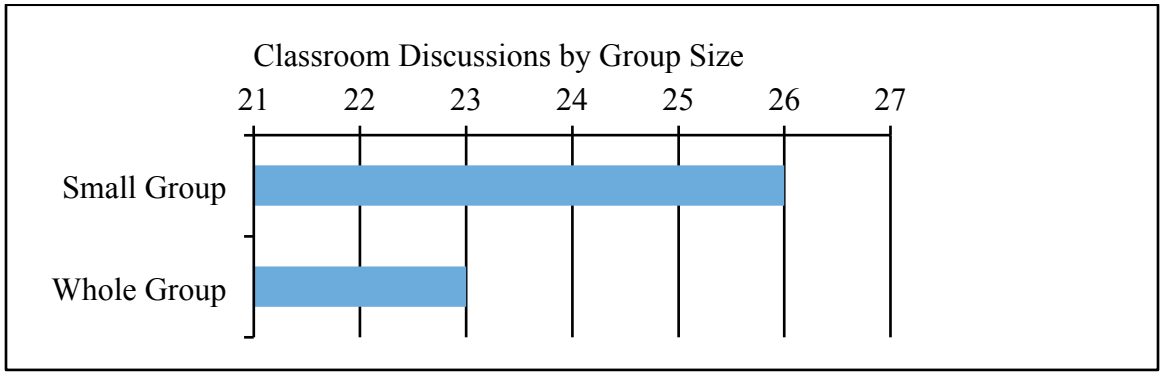
Figure 12. Classroom discussions by subject area.



Classroom discussions by group size. In Ms. Kanzer's classroom, students participated in discussions in both small group and whole class settings . Over the course of seven weeks of

observation, I recorded 26 small group discussions and 23 whole class discussions that lasted at least two minutes (see Figure 13). It is likely that this tally under-reports the number of small group discussions that occurred, as only five small groups held microphones at a time, so some discussions could have occurred unrecorded. Sometimes small group work resulted in discussions for some groups but not for other groups; while some groups worked independently on a problem assigned by Ms. Kanzer, other groups might have participated in a discussion about the same problem. For the purposes of this study, small groups consisted of a minimum of two students and a maximum of seven students, or one third of the classroom, which was the largest grouping other than whole class that I observed in Ms. Kanzer's classroom. During whole class work, all 21 students participated in the discussion, although not every student spoke during each discussion. The whole class size of 21 students decreased slightly when students were absent or out of the classroom for small group academic support.

Figure 13. Classroom discussions by group size



Classroom activities where discussions occurred. Discussions occurred during a variety of classroom activities in Ms. Kanzer's classroom (see Table 5). Within a given subject matter, discussions took place repeatedly during particular classroom activities. For example, in math, one student would often place their work under the document camera for all to see and explain what they did. Other students then commented on the work that was presented to the

whole class. This commonly resulted in a whole class discussion. I term this type of activity that led to discussion "Studying student work." This classroom activity only occurred during mathematics. I detail the classroom activities that students participated in during each school subject in Table 5. I also include how many times each classroom activity occurred within the corpus of 49 discussions.

Table 5. Classroom activities where discussions occurred, by school subject.

School Subject	Classroom Activity	# in the study
Math	1. **Studying student work:** Discussions that occurred when multiple students placed their work under the document camera, and other students raised their hands to comment and ask questions of their work.	8
	2. Checking answers: Discussions that occurred when students checked the answers to problems they had done in class or for homework with one another in small groups	6
	3. Solving problems: Discussions that occurred when students solved problems together in real time	3
	4. Other: Discussions that occurred when students participated in different types of work than studying student work, checking answers, or solving problems together.	3
Reading (Literacy)	**1. Sticky note sharing:** Discussions that occurred when students shared ideas about the book *Bud, Not Buddy* that they had recorded while reading at home.	11
	2. Answering response questions: Discussions that occurred when students were provided with questions about *Bud, Not Buddy* by the teacher, which they answered in small or large groups.	8
Writing (Literacy)	**1. Studying literary essays:** Discussions that occurred when students studied model literary essays and developed ideas about what it meant to write a literary essay	6

Listening	**1. Constructing a listening rubric:** Discussions that occurred when students were tasked with developing a rubric to measure how well they were listening to peers..	3
	2. How to measure sound: Students were asked to imagine how they would measure sound in a cafeteria as a kickoff to a discussion of measuring and improving their listening.	2

As exemplified in Table 5, the tasks that led to discussions were somewhat different in mathematics, reading, writing and listening. Reading, for example, was the only subject matter where students prepared for discussions at home. In math and literacy, discussions were grounded by visuals such as student work displayed on the projector or a passage of text from *Bud, Not Buddy*, but listening discussions were based on ideas and not grounded by visuals or student work. I elaborate on the differences between discussions in each subject matter in a forthcoming section of this study and share these activities here as context.

The differing classroom activities that led to discussions created the conditions through which students engaged with others' ideas, so I share these details as context. In the section that follows, I describe and analyze in detail two discussions that took place in Ms. Kanzer's classroom as a way of portraying how students engaged with others' ideas and further defining what engaging with others' ideas meant in Ms. Kanzer's classroom.

A Deep Dive into Two Discussions: How Students Engaged with Others' Ideas

In the previous section, I presented overview data on classroom discussions in Ms. Kanzer's classroom, including how frequently they occurred and their general structure. I now present two discussions, one in math and one in literacy. I do so in order to illustrate how students engaged with others' ideas in Ms. Kanzer's classroom, thereby answering the first research question in this study. I also depict what students discussed when they engaged with others' ideas. I chose these two discussions because they happened in the context of studying

student work in math and sticky note sharing in literacy, the classroom activities that most often led to discussions in these two subject areas. My full analyses of these two discussions is provided in Appendix J.

A math discussion: Studying Amelia's work.

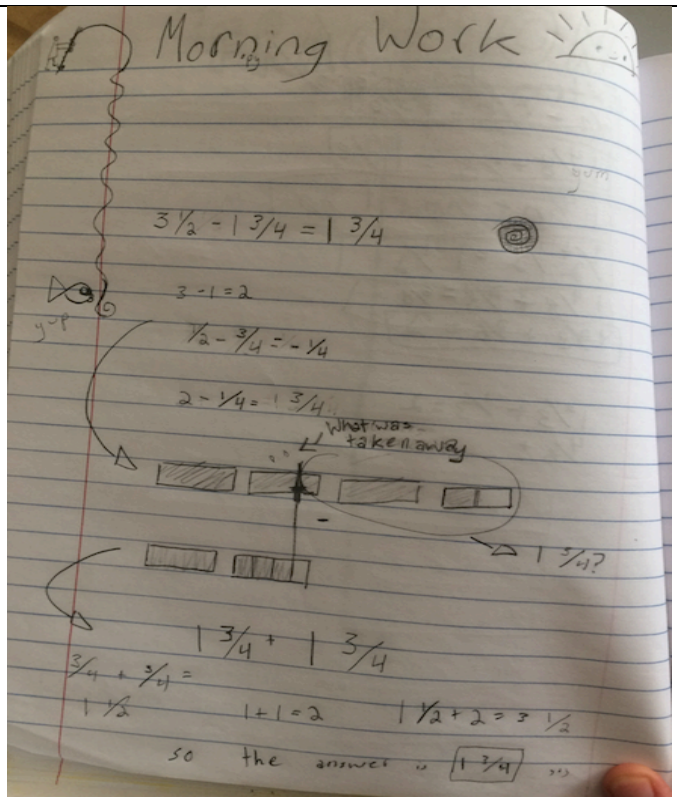
It was a wintry Monday in February. The class was abuzz with talk of the weekend, including the New England Patriots' loss in the previous night's Super Bowl. For morning work, Ms. Kanzer had asked students to solve the equation "3½ - 1¾ = ___." After the students had completed their morning work and conducted morning meeting, Ms. Kanzer ushered the class to their seats and launched a whole class discussion as follows:

> Ms. Kanzer: Who would like to show a number strategy for solving the first problem from the morning work? Now, the number strategy might have been much trickier for you. That's okay, because if somebody shares, you could try the number strategy too. Amelia, could you give that a try? If this was challenging, your mind is alert and your pencil might be moving. Go ahead, Amelia. Let's watch her.

The manner in which Ms. Kanzer launched the discussion was notable for multiple reasons. First, Ms. Kanzer asked the class if someone would be willing to share their *strategy* for solving the problem, not simply how they solved the problem. This focus on strategies was typical of mathematical discussions in Ms. Kanzer's classroom; eight of the 12 whole-class discussions I observed in Ms. Kanzer's classroom were structured as an "open strategy share" (Kazemi & Hintz, 2014) where one student shared a strategy for solving the problem while other students commented on their work. Second, Ms. Kanzer oriented the class towards learning from Amelia's work by noting that "if someone shares you could try the number strategy too " and telling the class to have their pencils out and mind alert if this work was challenging. This set up the students to be active participants in the discussion.

After Ms. Kanzer launched the discussion, Amelia walked to the front of the room and placed the following work under the document camera.

Figure 14. Amelia's work to solve 3½ - 1¾ = ___.



Amelia proceeded to explain her work as follows, pointing to her work as she delivered each part of her explanation:

> Amelia: What I did is three minus one equals two, and then I did one half minus three-fourths equals negative one fourth. And then two minus one fourth equals one and three fourths. And then down here I checked my work using addition. I did one and three fourths plus one and three fourths and then three and one half. Then this would equal one and three-fourths.

Through her explanation, Amelia made the argument that she used a valid strategy to solve the problem at hand. Though one could interpret Amelia's explanation as a listing of the procedures she followed, I interpret Amelia's explanation of how she subtracted wholes (3 – 1 = 2) then

fractional parts (½ – ¾ = - ¼) before combining these partial sums as a mathematical argument that the strategy she used to solve the problem is valid.

Implicit in Amelia's argument was a variety of mathematical ideas and content. First, she displayed how one might decompose and recompose numbers – and specifically "mixed" numbers – in a variety of ways. Second, her work suggested that the system of rational numbers extends below zero, making - ¼ a valid mathematical quantity. Finally, she used the inverse relationship between subtraction and addition to ensure that her work was accurate. Amelia's initial explanation provided students with a glimpse of a number of mathematical understandings that would enter the ensuing discussion.

For the remainder of the discussion, students responded to and built on Amelia's ideas. In Appendix J, I provide a full analysis of this discussion, including the mathematical content discussed, the way each student comment furthered the discussion, and who did what type of intellectual work in the discussion. In the sections below, I provide examples of the next few student comments and illustrate how each of these was an example of engaging with others' ideas.

EwOI #1: Bobby's response. After Amelia had completed her explanation, Bobby raised his hand and was called on by Ms. Kanzer.

> Bobby: I have a comment. I would have never thought to do addition to check my answer on a problem with fractions.

In his comment, Bobby engages with the ideas that Amelia posed both visually and verbally. Bobby responded directly to Amelia's idea. In particular, he engaged with the second half of Amelia's explanation, where she described using addition to check her work. By stating that he "never thought to do addition to check my answer on a problem with fractions," Bobby implied that he might have learned from Amelia's ideas. His response to Amelia highlights the inverse

relationship between addition and subtraction, further exposing this math content to other students in the class. Bobby's focus on this mathematical content in this brief comment, and his ability to transform it into a topic for collective consideration, is significant intellectual work.

Bobby also positively positioned Amelia's work by saying that he "never thought to do addition." This was one of many examples of students responding to others' ideas by complimenting them. Amelia interpreted Bobby's comment as a compliment; after he had finished his comment, Amelia responded "Thanks, yeah I usually do that when I solve any subtraction problem." All told, Bobby engaged with Amelia's idea in a way that brought out important mathematical content.

Engaging with Amelia's idea #2: Haley's response. After Amelia and Bobby had finished their exchange, Ms. Kanzer did not interject. Instead, students in Ms. Kanzer's classroom seemed to have internalized the expectation that their job was to respond to the work presented to the class. Ms. Kanzer called on Haley, and the following exchange ensued:

> Haley: Amelia I like your strategy of subtracting fractions, but that makes a negative fraction. Does that really work?
> Amelia: Yeah, it works, and I basically know that you can make negative fractions, and they're kind of like opposites of positive fractions
> Haley: That makes sense I didn't think of that.

With her initial comment, Haley engaged with Amelia's idea because her comment responded to Amelia's thinking rather than posing a new idea of her own. Haley engaged with a different part of Amelia's explanation than Bobby does by asking whether making a negative fraction "works." I interpret Haley's question about whether it "works" to subtract ¾ from ½ as a question about the properties of rational numbers and operations within that system. In other words, Haley asked if the system of rational numbers allows you to subtract to create a negative. It is not clear

whether Haley understood that one might be able to subtract integers to get a negative number (e.g., 1 – 2 = -1) or if the existence of negative fractions is what she did not yet understand.

Haley's response to Amelia highlights the importance of Amelia's understanding of the number system in her work. This is important mathematical content that may not have emerged publicly without Haley's attention. Haley also provided Amelia with the opportunity to make the additional claim that negative fractions are "kind of like the opposites of positive fractions." In other words, by engaging with Amelia's use of negative numbers, Haley made an important intellectual contribution and brings out key mathematical content.

Engaging with Amelia's idea #3: Haley's reference, prompted by Ms. Kanzer. In the two examples of engaging with others' ideas presented above, students responded to a single student's idea. These two responses concerned themselves with different aspects of subject matter content raised by Amelia's explanation. In other discussions, students' engagements with others' ideas were connected both to initial ideas and previous engagements. For example, after Bobby's comment, Ms. Kanzer could have elected to ask students about the inverse relationship between addition and subtraction that Bobby highlighted. Instead, she elected not to intervene, and Haley's question connected to Amelia's idea but not to Bobby's.

After Haley's question, however, Ms. Kanzer took a more involved tack. After Haley finished saying "That makes sense," Ms. Kanzer said the following:

> Ms. Kanzer: Haley, that was really great how you asked that question and Amelia explained it to you. That's really important math work. Could you explain Amelia's strategy in your own words now?

In this comment, Ms. Kanzer highlighted the importance of Haley's question and asking questions as a mathematical practice more broadly. In doing so, she highlighted the way Haley engages with Amelia's idea rather than the mathematical content she brings up. She then asked

Haley to rephrase Amelia's strategy, perhaps as a way of seeing if Haley understands what Amelia had just explained to her, or perhaps as a way of refocusing the discussion on Amelia's strategy. Haley rephrased Amelia's explanation as follows:

> Haley: She subtracted one half (pause) she subtracted one half minus three fourths, which is equal to negative one fourth. Then when you think of doing it negative, and then two minus one fourth is equal to one and three fourths.

Haley rephrased Amelia's explanation in a way that is similar to Amelia's original explanation and provided students with another chance to hear and comprehend Amelia's ideas. Haley's comment that "when you think of doing it negative" is perhaps the aspect of her summary that is the most different from Amelia's initial explanation. This comment may indicate that Haley now has an emerging understanding of negative numbers, perhaps inspired by Amelia's idea. Haley's summary of Amelia's idea is an example of engaging with other's ideas that was directly prompted by Ms. Kanzer. Both Haley's summary and Ms. Kanzer's comments constitute intellectual work that prolong the discussion.

Engaging with Amelia's ideas: a summary. In the pages above, I depicted how students engaged with Amelia's ideas during one whole class discussion of mathematics. This discussion was typical in the variety of ways that students engaged with others' ideas. Therefore, it helped inform my understanding of engaging with others' ideas as classroom talk in which students responded or referred to one another's ideas. Both Bobby's compliment and Haley's question were direct *responses* to the mathematical explanation posed by Amelia, and elicited a response from Amelia. In contrast, Haley's rephrasing of Amelia's explanation was a *reference* to Haley's thinking that was prompted by Ms. Kanzer. I view Haley and Bobby's responses to Amelia as fairly sophisticated examples of engaging with others' ideas because of the way they focused on details of the explanation and content that Amelia provided. Though Haley's rephrasing was

prompted by Ms. Kanzer, I do not view it as devoid of sophistication, as the act of listening, understanding, and being able to restate a peers' explanation is important intellectual work. Though the methods in this study did not allow me to study listening and see how other students understood Amelia's explanation, I imagine that each student came to their own understanding of Amelia's ideas, and that these understandings may have been altered by the ways in which Bobby and Haley engaged with Amelia's ideas.

Additionally, this discussion reveals the ways in which students' engagement with others' ideas exposed important mathematical content. These instances of engaging with others' ideas furthered the discussion by publicly calling out the way Amelia used her understanding of the inverse relationship between addition and subtraction and the existence of negative numbers. In other words, the intellectual work performed by Amelia, Bobby, Haley, and Ms. Kanzer helped expose mathematical content that otherwise may not have been highlighted in Ms. Kanzer's classroom.

A literacy discussion: Alonso's ideas about Bud waiting in line in *Bud, Not Buddy.* In this section, I present a whole class discussion in literacy in order to enrich our portrait of how students engaged with others' ideas. I chose this discussion because it stemmed from students sharing their sticky notes about the book *Bud, Not Buddy,* the classroom activity that most often led to discussions in literacy. This description draws on analysis presented in Appendix J.

Alonso's initial idea. At about 10:00 on February 1st, Ms. Kanzer's class was engaged in a familiar activity. The class was listening to an audio version of Chapter 6 from *Bud, Not Buddy,* the book the class was reading together. For homework the previous night, students had read the same chapter and written at least five sticky notes where they had questions or

comments about the text. Ms. Kanzer occasionally stopped the recording so that students could share their sticky notes.

The narrator read the text below, written from Bud's perspective:

> *"Line's closed. These here folks are the last ones."*
> *It was time to start lying. If I didn't get any food now I'd have to steal something out of someone's garbage or I wouldn't be able to eat until the mission opened for supper.*
> *I said, "Sir, I". The man raised his hand.*

At this point, Alonso raised his hand. Ms. Kanzer called on him. "I don't really understand why can't Bud just wait in the line," Alonso shared. "I mean why can't he just wait like everybody else?" he continued.

I interpret this as a literary idea because Alonso questioned the text, a reading practice that is seen as desirable by literary experts. In his comment, Alonso questioned why Bud cuts the line. This suggests that Alonso understands that in fictional texts, characters take actions for a reason rather than acting randomly, and that part of comprehending text involves understanding why characters take the action they do. Alonso's question served as an effective spark for discussion – and engaging others' ideas – because it opened up the text and invited others to analyze it as well.

Engaging with Alonso's idea #1: Cassie's response. After Alonso shared his question, Ms. Kanzer turned to the class and said simply, "Responses?" Cassie raised her hand, and offered the following: "Well, those people were the last people in line, so he had to go wait with him so he could get food."

Cassie's comment engaged with Alonso's idea not by directly answering the question Alonso posed, but by offering an explanation of the character's actions. Cassie seems to suggest a course of action for the character. In saying that Bud "can just wait with them," Cassie seems to be saying that Bud should just wait with them, even though the shelter employee tells Bud that

the line is closed. This comment furthered the discussion by offering an explanation of the character's actions. After Cassie's response, Ms. Kanzer said "Does that answer your question Alonso? If you're not convinced yet you could get some more ideas from people." This recognition that Cassie's comment may or may not have answered Alonso's question was an important recognition by Ms. Kanzer that multiple responses and interpretations had the potential to enrich the discussion and Alonso's understanding. Alonso took up Ms. Kanzer's suggestion in short order.

Engaging with Alonso's idea #2: Randy's response. Alonso noticed Randy's hand up and called on him. The following exchange ensued:

> Randy: He's trying to get there in time before the shelter had to close. If he got there earlier he would have time to eat, but when he got there he was sort of late.
> Alonso: But why?
> Randy: Well the line has to close at a certain time so they have enough food for tomorrow.
> Alonso: I'm asking why does the line close at a certain time.
> Randy: They can't keep serving food all day because it's the Great Depression and they might run out because there are so many people.

Randy's initial comment engaged with Alonso's idea because his comment was a direct response to Alonso's question. Randy used an aspect of the setting – the late hour of day – to respond to Alonso, context that helps explain why Bud cuts the line. This additional context is important to understanding why Bud takes the actions he does.

Yet Alonso's follow-up question suggests that he was not convinced by Randy's answer. After Alonso further probes Randy's thinking, Randy added that the shelter might run out of food because they probably have limited food because it is the Great Depression. This reveals that in addition to the time of day, Randy is using the historical context of the book to inform his thinking about Bud's actions. This is an important aspect of literary thinking and a key contribution that Randy made to the discussion. Randy, a student who was often pulled from the

classroom for special education services, made a clear contribution to the discussion in the way that he engaged with Alonso's idea. Alonso's role in this exchange – probing Randy's thinking until Randy's response makes sense to him – is also important intellectual work.

Engaging with Alonso's idea #3: Tim's response. After Randy and Alonso's exchange ended, Ms. Kanzer walked back towards her computer to restart the audio. As she did so, however, she noticed Tim – a quieter student – with his hand up. She turned towards him.

> Ms. Kanzer: Oh I'm sorry Tim, do you have something different?
> Tim: Yeah it's something like Alonso's – I think the reason Bud wanted to get into line first was because he was really hungry, and he needed to get some food because he didn't eat last night because he was running away.
> Ms. Kanzer: Got it Alonso? Good question.

Tim's comment responded to Alonso's initial question about why Bud wanted to cut the line. In his response, Tim focused on the character's current situation – running away – and his personal needs as a way to describe his actions. In contrast with the first two students, Tim provided an empathetic, character-driven point-of-view to the discussion by focusing on the character's needs as the motivation for his actions. Thus, Tim provided one further interpretation of the character's actions, another way in which students' engagement with Alonso's idea added to the discussion.

Engaging with Alonso's idea: A summary. In the pages above, I depict how students engaged with the question Alonso raised about *Bud, Not Buddy*, the text that the class was reading at the time. These examples shed additional light on what it meant to engage with others' ideas in Ms. Kanzer's classroom. Rather than offering their own ideas about the text, Cassie, Randy, and Tim each responded directly to Alonso's question. These responses were not redundant. Instead, the three students who responded to Alonso all provided slightly different explanations for why Bud cut in line. They also presented contrasting examples of how students engaged with Alonso's idea and furthered the content at hand. While Cassie explained Bud's

actions and Tim responded to Alonso by empathizing with Bud's motivations and needs, Randy used the historical context to inform his explanation of Bud's actions and his response to Alonso. In combination, these engagements enriched the discussion sparked by Alonso's sticky note and provided students with greater opportunities to learn subject-area content. This type of exchange – classroom talk in which students responded or referred to others' ideas – informed the way I understood, conceptualized, and defined engaging with others' ideas after spending two months in Ms. Kanzer's classroom.

Engaging with Others' Ideas Across Discussions: Responding and Referring to Others' Ideas.

In the previous section of this paper, I explored two discussions in depth in order to depict what it meant to engage with others' ideas in Ms. Kanzer's classroom. In those analyses, I highlighted moments when students responded to or referenced others' ideas. Here, I take a wider view and present data on how students engaged with others' ideas across all 49 discussions analyzed in this study in order to identify the range of ways in which students responded to and referenced each other's ideas.

In my analysis of discussions in Ms. Kanzer's classroom, I identified two broad-level categories for how students engage with others' ideas – responses and references. As noted previously, I define responses as instances when a student responded directly to another student's idea, and references as times when a student mentioned another student or their idea before providing their own idea. Table 6 displays the number of student comments that were coded as responses and references to one another's ideas, followed by the precise ways in which students responded to or referenced one another's ideas.

Table 6. Code counts, engaging with others' ideas (n = 49 discussions).

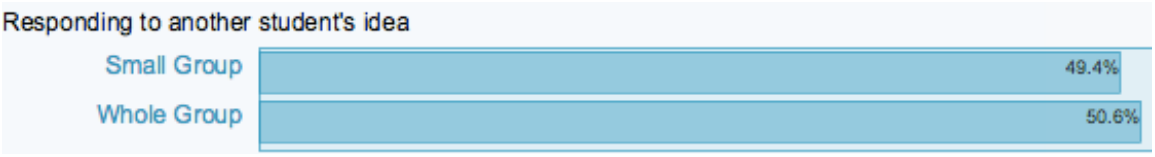
Parent and Student Codes	Count
Responding to others' ideas	331
Adding on	69
Trying to understand another student's idea	65
Agreeing	54
Answering a student question	43
Disagreeing	36
Critiquing	29
Making suggestions	23
Complimenting	7
Prompting another student	5
Referencing others' ideas	88
Explaining or rephrasing	27
Connecting to another student's idea	24
Contrasting with another student's idea	21
Referencing an idea from a previous day	16

Though students commonly responded to and referenced other students' ideas, the manner in which they did so varied significantly. In the sections that follow, I provide qualitative examples of how students responded to and referenced one another's ideas. I choose examples that vary by school subject, student grouping (e.g., small group or whole group), task type, and participating student. I provide these varied examples in order to create a more accurate portrait of how students responded to and referenced others' ideas.

Responding to others' ideas. Instances of students responding to one another's ideas such as the one presented above were spread across the seven weeks of instruction observed for this study. At least one discussion where a student responded to another student's idea occurred during all but two days of data collection, and for one of these days students had a substitute teacher most of the day. In other words, students' responses to one another were distributed across the days of instruction included in this data set.

Students responded to other students' ideas during both small and large group discussions. Figure 15 shows that responses to one another's ideas were evenly distributed between small group and whole group work, with 49.4% of responses coming in small group and 50.6% of responses coming in whole group. This closely matches the distribution of discussions present in the data set. Among the 74 discussions coded, 48% of these discussions occurred in a small group setting, while 52% of these discussions occurred in whole group.

Figure 15. Responding to others' ideas by group size.



Taken together, these results show that responding to other students' ideas was a regular part of participation in Ms. Kanzer's classroom. Students spoke to one another about their ideas, and did so regularly. These summary results, however, say little about exactly *how* students responded to one another's ideas. In the following sections, I present the distinct ways in which students responded to one another's ideas, providing examples along the way to illustrate these results.

Adding on. The most common way that students responded to one another's ideas was by adding on. Sometimes, students added on to one another's ideas in ways that built directly off of what other students said. In a conversation between Dan and Tara about the themes of the story *Eleven*, Tara came up with a theme, then Dan added his idea onto her idea.

Tara: This is also message to teachers. Pay attention, listen to what the kids are saying before dissing on them.

Dan: Yeah, I don't think Mrs. Price is a very good teacher.

In this exchange, Dan first agrees with Tara's idea ("Yeah"), then adds a comment that Mrs. Price is not a very good teacher. This idea is connected to Tara's idea about teachers, as previously Dan and Tara had been discussing other aspects of the story. After agreeing with Tara, however, Dan's point is fundamentally original.

Some conversations featured frequent uses of adding on. In the conversation about *Eleven* referenced above, Dan and Tara added on to one another's ideas 9 times, while in one conversation about *Bud, Not Buddy*, they added onto one another's ideas 20 times. This means that about half of all instances of adding on occurred in two individual conversations between Tara and Dan. In these conversations, Tara and Dan commonly followed the pattern in the above transcript where one student would pose an idea then the second would agree with the idea then add something else. Sometimes, such as in the example below, this pattern would repeat for multiple turns of talk.

> Dan: Okay, I'm going to page 104. What does Bud lie about, and what does he hope to gain by lying? I think he relies too much on lying.
> Tara: Well, what he hopes to gain by lying isn't right, which is going to Grand Rapids.
> Dan: Yeah, he's trying to lie for his advantage. Like "oh, yeah, I live in Grand Rapids"
> Tara: Yeah, he lies too much. He should only lie if it's really going to help him. He seems almost too proud of how he's lying and how he lies.
> Dan: Yeah. It's like, yeah, uh, I live in the Grand Rapids, can you bring me back there? And then at the end of the chapter it said, he's going there in like a day. So, I think if he wanted to go there he had to stay with that guy for a day.
> Tara: Yeah and that guy is obviously going to get suspicious, cause [Bud] obviously won't know Grand Rapids or where to go.

In this conversation, Tara and Dan verbally agree with one another's ideas while building ideas by adding on further comments to the conversation. This form of responding to one another's ideas was unique in that students who added on to one another's ideas extended the conversation into new content while still attending to previous student' ideas. In contrast, questions, critiques, and suggestions on other students' ideas fundamentally kept the

conversation grounded in the work presented. The implications of the difference between adding on and other forms of responding to students' ideas will be discussed later on in this paper.

Trying to understand others' ideas. Students frequently responded to one another in order to help them understand other students' ideas. One way they did this was by expressing when they were confused by another student's idea. During one whole class discussion in mathematics, Maggie explained how she estimated what 5 x 7/8 would be, before Haley responded to her.

> Maggie: Well, I know it can't be one. Because, first of all, I would have said this if we weren't multiplying fractions but since seven-eighths is so close to a whole number, I'm going to say it anyway. Since it starts with five times blank, or whatever number this is, it's an "X" right now. Since it's five times something, then you know the answer if it were a whole number here. It would have to be greater than or equal to five. So, since five is already way bigger than one, I know that even though we're using a fraction, it's a large fraction. So, it has to be greater than one.
> Haley: I'm confused. Can you write something out on the board so that we can understand it more? Like, can you show what you were doing?

Haley's response to Maggie's idea expresses that she doesn't understand Maggie's idea. She does this in a way that shows that she is attempting to understand Maggie's explanation, because she states that she wants Maggie to show her work so that she can "understand it more." Haley also expressed a justification for why she wanted Maggie to explain her thinking on the board. At other times, students stated that they were confused without elaborating or giving suggestions. For example, after Carlos explained that he solved 3½ - 1¾ by converting both fractions into eighths, Bobby responded by saying "Well, to me it's kind of confusing how you have like two of the squares with the skinny eighths and then the other two with thicker eighths." In this example, Bobby simply states that he is confused and responds to the part of Carlos's mathematical explanation that confused him.

Student tried to understand others' ideas not only by expressing confusion but also by asking clarifying questions. For example, while answering reading response questions about Chapter 7 of *Bud, Not Buddy*, Calvin explained to Rebecca that the countryside in *Bud, Not Buddy* was "like two different cities." Rebecca promptly responded to Calvin "What do you mean? I don't understand what you mean." [2-14] This question seemed to be intended to help Rebecca better understand Calvin's idea. On another occasion, Ms. Kanzer asked the class to estimate the answer to 5 x 7/8. After the class worked on their own for a couple minutes, Carlos shared that he knew the answer had to be less than 10 because 5 x 16/8 is ten. Oscar immediately raised his hand and asked "Why are you using 16/8?" This response also seemed to be intended to help Oscar better understand Carlos's idea. These questions suggest that students in Ms. Kanzer's classroom felt that it was important to understand one another's ideas, and this value was actualized through asking questions in order to understand what their classmates said.

Occasionally, students posed to each other a series of clarifying questions in quick succession. At the end of the math period one day, Rebecca called over to Calvin to ask him for help with her homework from the previous night. Rebecca started by telling Calvin her answer, then the following discussion ensued.

Rebecca:	I got 38 for number 19.
Calvin:	**How did you get 38?**
Rebecca:	I don't know.
Calvin:	Okay. Oh I got 38 too. That was my final answer.
Rebecca:	Right. Did you get- Oh wait I definitely did this part wrong. I don't know what I did wrong, but I definitely did it wrong. I don't know-
Calvin:	**What was your equation? What was your starting equation?**
Rebecca:	That.
Calvin:	**Yeah that. Then you did it wrong?**
Rebecca:	Yeah.
Calvin:	**What was your next step after the equation?**

In this discussion, Calvin asks Rebecca a series of clarifying questions in order to elicit her thinking. This type of questioning was unique to Calvin; he asked students a series of questions during four different discussions, and was the only one of the five focal students to ask a series of multiple clarifying questions. He seemed to use this type of questioning not only help himself understand another student's idea, but also to help his fellow student think through their own work. In a discussion with Oscar about how to share seven brownies among five people, Calvin first explained his thinking then asked "How did you do it?" Oscar replied "I gave one brownie to each person, and then there's two left over and (pauses) I don't know I can't remember." Rather than moving on, Calvin drew closer to Oscar's paper, looking intently at his work. As he did so, he described what he saw. "So it looks like you did one, two, three, four, five, so ... you did five lines, and divided them among five people," Oscar started. He then followed up with a further question to Oscar. "Do you know what you did with the two leftover?" When Oscar didn't respond, Calvin prompted Oscar once more by asking "Did you split them between the five people somehow?" This series of questions, each one more specific than the last, was a response to Oscar's work that seemed to be intended to help Calvin understand what Oscar was thinking. Though not representative of the way most of the classroom engaged in others' ideas, these series of questions were a distinct manner in which a student tried to understand other students' ideas in Ms. Kanzer's classroom.

A final note about the clarifying questions students used is that sometimes questions students asked of others were *not* used to understand other students' ideas. Instead, these questions formed subtle critiques of others' thinking. I will further elaborate and provide examples of these questions when describing the critiques that students made of others' ideas.

Answering questions posed by students. Another common way in which students responded to one another's thinking was to answer questions posed by other students. Sometimes these answers were provided in response to students' attempts to understand others' ideas, which I presented in the section above. At other times, students answered questions that their peers had raised from their reading of the text or problem at hand. For example, during one reading workshop, partners took turns reading aloud to one another a section of *Bud, Not Buddy* that they had read and generated questions about the night before for homework. Bobby and Sorah began reading the chapter where Bud thought he saw blood on the wall of a shed at his foster home. When Sorah arrived at the part that pertained to his questions, Bobby told her to pause and the following exchange ensued:

> Bobby: My two questions were maybe it isn't blood, when it said like there's blood. And then why would they keep him in there? Because, if the other kid died in there, then why would he put...
> Sorah: Because they're murderers. Don't they have a double-barreled shotgun?
> Bobby: I know but like why would they do that-
> Sorah: Because they're not nice at all! (Reading, 1-19)

In this exchange, Bobby asks Sorah questions about the text, and Sorah responds by answering these questions based on evidence and inferences she made from the text. In both small-group and large-group work, students almost always engaged with others' ideas after their peers asked them questions

Some questions that generated answers from other students were prepared in advance through in-class and homework assignments, such as the sequence above, while other questions were developed and answered extemporaneously. During one of the first days of the class' unit on writing literary essays, Ms. Kanzer read aloud the story *Eleven* by Sandra Cisneros. At the end of the story, Vince raised his hand.

> Vince: I mean, I also just don't really get the point of the story.

Teacher: OK. Dan, could you help him out with that? And that's called author's message. What's the point of this? Right?
Dan: The point is, if you're one age, you're all the other ages too.
Vince: So if you're twelve, you can be a hundred-
Dan: You're like age inside other ages
Vince: Oh, like when she ... The doll? When she uses things, the doll ...
Dan: Yeah, it's like the Russian doll.

In this sequence of talk, Dan answers Vince's question about the story as a way of responding to his idea. After two attempts at answering Vince's question, Dan's doll analogy seems to satisfy Vince's desire to further understand the story. Crucially, this exchange only ended when Vince seemed to understand Dan's response. Dan's multiple attempts to answer Vince's question was rare in the data set, as students typically answered other students' questions in a single response without follow-up. Another topic worthy of study in this transcript is the role of the teacher in using Vince's question as a launching point for class discussion and for students to engage with others' ideas. The teacher's role in how students engaged with other's ideas will be addressed in a later section of this manuscript.

Agreeing and disagreeing with others' ideas. In addition to trying to understand other students' ideas and answering questions posed by other students, students in Ms. Kanzer's classroom often agreed and disagreed with one another's ideas. Students explicitly expressed agreement with another student's idea more frequently than they expressed disagreement, and did so with verbal affirmations that they understood and agreed with another student's idea. For example, at the beginning of the unit where students were learning to write literary essays, students read the story *Eleven* by Sandra Cisneros, then discussed the lesson of the story in partnerships. In the story, the main character cowers as the teacher accuses her of leaving a dirty red sweater in the classroom. Students then split into small groups. One part of Dan and Tara's conversation included the following exchange:

Dan: It'll be interesting to see what impact the story has on [the main character].
Tara: Yeah
Dan: I think it taught her to speak up.
Tara: Yeah, like you need to protest something to get what you want.
Dan: Right.

In this exchange, Tara agrees with Dan's opinion that the main character learns to speak up. Tara elaborates on Dan's idea slightly – "you need to protest something to get what you want," an addition that is connected to Dan's idea that the exchange with the teacher "taught her to speak up."

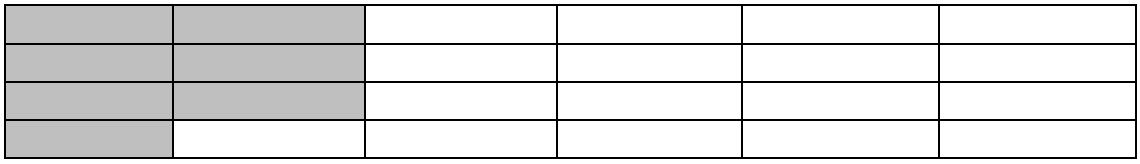
Students more frequently stated they agreed with a fellow student's ideas even more explicitly during whole class conversations. For example, part of a discussion about why Bud introduced himself as "Bud, Not Buddy" proceeded as follows:

Amelia: On page 103, yeah, please turn to page 103. On the sticky note I wrote, "Why didn't the man just say, or why didn't Bud just say his name is Bud. Not Bud, not Buddy?" Cassie?
Cassie: I agree with you. When you say your name to someone, they can pretty much get the hint that if you say your name is Buddy, then obviously they're going to call you Buddy, not Bud. If you just say, "It's Bud", then they'll get the clue not to call you Buddy. Tara?
Tara: I do agree with you Cassie, but my last name is spelled kind of weirdly, and so when I tell people I'm Tara, I automatically spell it out for them. So, I wouldn't need to do that, but it's not that bad for Bud to spell out his name. Rose?
Rose: I agree with Tara. For grownups, you could just say Bud because grownups understand more to just call him Bud instead of, like they understand just to say Bud and not say Buddy. But for kids, they're younger and they might choose to call him Buddy just to annoy him. So, I think he could just he could say, "Bud, not Buddy. Just call me Bud."

In each of the three responses following Amelia's initial idea, students started by agreeing with one another's idea. Both Cassie and Rose's points aligned with the arguments made by students before them. On the other hand, Tara's statement "I agree" was followed by commentary that did not necessarily indicate complete agreement with the previous student's idea. Tara essentially counters Cassie and Amelia's point about Bud's introduction by arguing that introducing himself

as “Bud, Not Buddy” might be useful. This varying use of agreement suggests that not all responses to student ideas that started with “I agree” were substantively in agreement with previous comments.

Students also commonly disagreed with one another’s ideas. Over the course of the 74 discussions, students explicitly disagreed with another student’s idea 36 times. One such disagreement took place between Hannah and Bobby during small group math work. Ms. Kanzer had asked students to shade in 7/8 of a template of 24 squares. Hannah’s squares looked like this: *Figure 16.* Hannah’s drawing of 7/8.



Bobby looked over at Hannah’s work, and the following conversation ensued:

Bobby: So, you used the whole thing to make seven eighths?
Hannah: It’s still seven eighths, it's just different.
Bobby: No, it's not seven eighths.
Hannah: No, it is seven eighths.
Bobby: That's seven twenty-fourths.
Hannah: No, that's seven eighths.
Bobby: That's seven twenty-fourths.
Hannah: Okay, what I did- No. See though-
Bobby: We have to use the whole grid.
Hannah: But I just took a piece of the whole grid and I made it into seven-
Bobby: But [Ms. Kanzer] wanted us to use the whole grid.
Hannah: Fine, fine, fine.

Bobby’s disagreement with Hannah’s claim that she had shaded 7/8 of the picture was typical of disagreements during discussions in Ms. Kanzer’s classroom. While some disagreements lasted longer than others, disagreements were often followed by defenses where students provided evidence to support their claims. Hannah’s note that she just “took a piece of a grid and made it into 7/8’s” defended her claim against Bobby’s disagreement. This pairing of disagreements and

defenses was typical, particularly in small group work, where students tended to disagree with one another with more frequency, and where disagreements lasted a greater number of turns of talk; 63% of disagreements and 59% of defenses found in the data occurred during small group work.

Notably, students' agreements and disagreements were resolved in a variety of ways. In the case above, Bobby's appeal to the authority of the teacher's request seems to have quelled the disagreement. In other cases, disagreements tended to be resolved through power negotiations related to student' socially-constructed levels of authority in the classroom. I will discuss these power and authority dynamics later in this chapter.

Critiquing and making suggestions. Students frequently responded to one another's ideas by providing critiques of and suggestions for one another's work. I define critiques of other student' work or ideas as critical comments about another students' work that did not have ideas for improvement attached to them. For example, in the "Sharing Several Brownies" problem, Iris's comment that Tara's strategy was "a little bit repetitive" constituted a critique of Tara's work, as her comment was somewhat critical but did not provide a suggestion.

During some discussions, multiple students offered critiques of the same student's work in quick succession. After Iris made her critique of Tara's work during the "Sharing Several Brownies" problem, Randy raised his hand and made the following comment:

> Randy: Do you think that ...? I'm just trying to say that ... it just sounds like you're saying that you basically cut up the brownies into 200 pieces exactly, like from every brownie, because the way you just say, "I cut it up in 200 hundredths," I just thought at first that you were actually going to do that, but it's kind of impossible to cut a brownie into 200 pieces and that's basically a waste of the brownie…

In this comment, Randy engages with Tara's idea by thinking it through, and closes with a comment intended to point out the implausibility of Tara's solution. Though Iris and Randy's

comments addressed Tara's idea in different ways, both formed critiques of her work. This series of critiques in quick succession was commonplace in this study.

Though critiques occurred frequently in whole-class mathematics discussions, they also occurred during small group work. During the discussion about how one might measure the volume of talk in a school cafeteria, students brainstormed ideas in pairs first, then met up with another pair and offered their idea. When Bobby's partnership joined with Calvin's partnership, the following sequence of talk ensued:

> Bobby: I was thinking that everyone could have a microphone, and like they could just measure the volume on each microphone.
> Calvin: Why would everyone have a microphone? That's a lot of microphones.
> Bobby: No, not everyone. Like each table, they would have a microphone hanging down from the ceiling.

In this example, Calvin critiques Bobby's idea on the basis of practicality, without providing an alternative way to measure volume. After Calvin's critique, Bobby modified his idea, noting that the cafeteria could instead have one microphone per table.

As alluded to when describing the questions students asked of one another, students sometimes critiqued others' ideas by asking questions that formed subtle critiques of others' ideas. During one of a series of lessons on listening, students were asked to brainstorm how one might measure the volume level in the cafeteria, as an introduction to helping the student come up with how they might measure good listening in their classroom. In his small group of students, Vince wondered aloud "Maybe they could figure out the average volume of a kid in the cafeteria, and then multiply it by the number of kids in the cafeteria." Andrea responded "But how would they figure out the average volume of a kid? There's no way to do that." At first glance Andrea's response might appear to be an attempt at understanding Vince's idea, but her tone and placing her question in the context of her whole statement makes it clear that her

response is a rhetorical critique and not an invitation to Vince to further explain his thinking. Thus, it is important to note that students sometimes asked questions as a form of critiquing others' ideas.

Students' responses to critiques varied; while some students defended or ignored critiques, other students changed their ideas based on critiques or modified them as Bobby did above. One common response to critiques was for students to defend their ideas against other students' critiques. After Randy's comment Tara's strategy for splitting two brownies into 200 pieces was impossible, Tara responded "I'm trying to be mathematically realistic, not logically realistic." This response to Randy's critique defended her idea by characterizing Randy's critique as "logical," not mathematical. Similar to Tara's defense, students sometimes nominally agreed with a student's critique before defending their own idea. During a discussion of whether Bud from *Bud, Not Buddy* liked his name, Gio repeatedly critiqued Randy's ideas. One such exchange went as follows:

> Randy: I think Bud's like, "If I got a little bit better name than Buddy then that guy wouldn't beat me up."
> Gio: He didn't get Buddy. He got Bud as his name.
> Randy: I know but if the guy said this, "Bud's kind of like you're not really tough" then he wouldn't like his name. I mean not that I'm offending all the Bud's in the world, but that like ... that name kinda sounds like you're a flower. You basically you want a name where kids won't really be mean to you.
> Gio: Well that name was the mom's choice, not his.
> Randy: I know. But I think he wanted a tough name.

During this exchange, Randy offers multiple ideas for how Bud feels about his name, which Gio responds to with concise critiques. Randy follows both of Gio's critiques by saying "I know," thus acknowledging the validity of Gio's idea, before continuing to maintain why his idea had merit.

Students made suggestions for how to improve one another's ideas less frequently than they offered critiques, and these suggestions occurred almost exclusively during whole class discussions of mathematics. Students who made suggestions about one another's work often began their comments as critiques, but then took the additional step of providing an idea for how the presenting student could improve their work. For example, after Amariah presented a solution to a problem in which she added 3 and 1/6 to 3 and 5/8, Haley raised her hand and made the following comment:

> I got a totally different answer from you and looking at your work is very overwhelming because there's a lot of numbers. I think you could space it out a little more, because it's like one big equation. [Math 2-2]

Haley's comment started out as a critique, but her note that Amariah could "space out her work a little more" provided a concrete way for Amariah to make her work more comprehensible to others.

Students commonly used the word "suggestion" when they offered an idea for how a student might improve their fellow student's work. After Calvin displayed and explained his work on a math problem, Cassie raised her hand and responded by saying the following:

> I don't have a question, I have a suggestion for Calvin. I think you should circle your answer because it would be more clear.

Later in the conversation, Iris chimed in, also attending to how Calvin presented his work:

> I think it might be helpful to label, you see how you've written 8, 16, 8, 4, 32? I would find that helpful to do that on the bottom.

The use of the words "suggestion" and "helpful" make it clear that in these instances, Iris and Cassie engaged with Calvin's ideas in ways intended to help him improve his work. Notably, these suggestions differed in the extent to which they offered the reasoning behind their suggestions. Cassie offered that circling his answer would make his work "more clear," while the reasoning behind Iris's suggestions remained implicit.

Unlike the examples above, students sometimes referenced the merit in others' ideas before providing suggestions, rather than appending suggestions to critiques. For example, during a whole class discussion of fractions Tara shared the theory "the smaller the fraction the bigger the denominator." Vince responded to the idea by noting "Tara, I believe in what you said, except I think you wanna switch it around because the bigger the denominator the smaller the fraction." This suggestion recognized the value in Tara's idea before offering a suggestion intended to amend her idea.

In sum, students in Ms. Kanzer's classroom responded to one another's ideas in many ways. Students most often responded to others' ideas by adding on to their ideas or trying to understand their ideas. Students also responded to others' ideas by answering student questions, agreeing and disagreeing with others' ideas, and critiquing or making suggestions on others' ideas. That said, responding directly to one another was not the only way that students engaged with others' ideas. In the section below, I detail how students referenced other students' ideas without speaking to them directly.

Referencing others' ideas. Referencing other students' ideas was the second broad category of ways in which students engaged in one another's ideas. Broadly speaking, references to others' ideas occurred when students discussed the ideas of other students without responding to them directly. Students referenced one another's ideas less frequently than they responded to one another's ideas, but did so in a few distinct ways: explaining other students' ideas, connecting to other students' ideas, and referring to ideas from previous days.

Explaining. On a number of occasions, students explained one another's thinking. This sometimes happened at the request of the teacher. On a Friday in February, students discussed the rubric they were making to answer the question "What makes a good listener?" before

pausing their discussion for lunch and recess. Upon their return to the classroom, Ms. Kanzer started by asking another student to explain Haley's idea, which Cassie took up.

> Ms. Kanzer: Who can remind us what Haley's suggestion was before lunch. Do you remember what she was suggesting?
> Cassie: She was saying a metaphor, that you should have the base of the puzzle before you connect all the pieces.

In the turn of talk above, Cassie does not speak directly to Haley, but rather restates what she said earlier. This is one example of a student referencing another student's idea by explaining or repeating that idea. Overall, students explained one another's thinking 20 times over the course of data collection. These instances of rephrasing or explaining one another's thinking happened more often in whole group than in small group scenarios, and were prompted by Ms. Kanzer—as in this case— more than half the time.

In some cases, however, students rephrased one another's ideas on their own. During the discussion of the Sharing Several Brownies problem (see page 60), Tara's explanation of her work was immediately followed by an expression of confusion and a student explaining Tara's idea. The discussion proceeded as follows:

> Tara: I decided to divide the two brownies that were left into hundredths because I find it easier to find a fraction of something when I have lots of smaller pieces, and then I can make the fraction equivalent. If you make the extra brownies into 200 and divide by 5 you'll get 40, and the 40 would be equal to 40 hundredths, which would be equal to four tenths.
> Rebecca (whispering): What? I don't understand anything she just said.
> Iris (whispering to Rebecca): Okay, so Rebecca, [Tara] made the two extra brownies into two 100s and she's dividing both of them in five.

In this instance, Iris engages with Tara's idea by referencing it in her explanation to Rebecca. This type of explanation was not common in the dataset, but nonetheless formed a unique way that students referenced one another's ideas.

Connecting and contrasting. Another way that students referenced others' ideas was by connecting their ideas to those of other students. This form of engaging with others' ideas included phrases such as "It's just like what Vince said" or "We did the exact same thing." These phrases explicitly connected the speaker's ideas to those shared by other students.

For example, while Amelia was presenting her work on one occasion, Andrea turned to her math partner and said "She made a common denominator – I totally did that!" During the Sharing Several Brownies problem, Amariah started her explanation by saying the following:

> Amariah: I did it like Dan did it. Instead of saying that everybody ... Instead of dividing two of the brownies up, I divided all of them, and I divided them into five pieces because there were five people. Each person would get one of the brownies.

In this comment, Amariah connected her work to Dan's without responding to his work directly.

Students also made more nuanced connections between their work and the work of others. Rebecca contextualized her contribution to a math discussion in the following fashion:

> Rebecca: Okay, so kind of what like Vince said-
> Teacher: Okay.
> Rebecca: But also, different.
> Teacher: Okay.
> Rebecca: So, I connected all of the equivalent fractions in a line, while I also did this part. I don't know if that means anything, but it looks like a line graph, if you guys know what that is.

This shows Rebecca referencing Vince's work and both connecting her work to Vince's contribution and pointing to the ways in which her ideas were distinct.

Some students contrasted student ideas even more explicitly. Oscar, speaking to Andrea about her theory about the main character's feelings about his name, noted the following:

> Oscar: Um, well yours is different than Amariah's because, like, you're talking about emotions like feelings, like how Bud keeps in his feelings from everybody a little bit, in your answer and in your analysis. And then you're talking about other pieces of evidence like it's a little fist of love waiting to, um, unfold and be seen by the world, you're talking

about how his feelings are, like how he's keeping them locked up from himself and other people. And that's different than Amariah's.

On most occasions, students connected or contrasted their own idea to that of other students. Therefore, Oscar's contribution was unusual in the data set in the way in which he contrasted two students' contributions that were not his own.

Referencing ideas from previous days' discussions. A final way in which students referenced one another's ideas was by bringing up ideas from a previous days' discussion. This did not happen frequently – there were only seven coded instances of students bringing up ideas from previous days. These ideas happened exclusively during whole class discussion. Bobby made four of the seven references to ideas from previous days. In one of these instances, Bobby referenced a whole-class discussion from the previous week in which Amariah created equivalent fractions. With Gio up at the board displaying his work, Bobby raised his hand and was called on.

Bobby: Um, so, this is kind of like what Amariah showed. Remember that, when she was trying to get to the equal denominator?

Ms. Kanzer: Mm-hmm (affirmative)

Bobby: And, that was 24 because we were doing the same problem, and I just realized that there are 24 squares and Amariah got to 24 when she was doing that.

Ms. Kanzer: Can you respond, Gio, can you respond back to what Bobby just said?

Gio: I didn't understand what Bobby said

Bobby: So, you know how Amariah, up at the board was trying to show how to get any even denominator?

Gio: Mm-hmm (affirmative)

Bobby: Um, so, then it made me think that we were doing the same problem and there's 24 equal little squares in the rectangle, and it just made me think of what Amariah did.

Gio: Yah I didn't think of that. When you reminded me I thought of it and then it made sense to me once you told me.

In this part of the discussion, Bobby brings up an idea that Gio seems to have forgotten. Though it is difficult to know what other students remembered from previous days' discussions, Bobby referenced discussions from not only previous days but from multiple weeks prior. On another occasion, he noted that "what I mean is the bigger the denominator the smaller fraction, kind of like Vince was saying a few weeks ago." Though these examples did not exclusively take place in mathematics – Oscar referenced an idea Vince had about the listening rubric on a previous day – they largely occurred in whole class discussions of mathematics.

Summary: Engaging with others' ideas by responding and referring. All told, students in Ms. Kanzer's classroom regularly engaged with others' ideas by either responding or referring to other students' ideas. Students most often responded directly to others' ideas by adding on to their ideas, trying to understand their ideas, or answering student questions. Students referenced others' ideas less often than they responded to others' ideas. When they did, they referenced others' ideas in a few distinct ways: by explaining others' thinking, connecting and contrasting their own ideas with others' ideas, and referencing ideas from previous days' discussions. Taken together, the responses and references students gave to others' ideas during 49 discussions shows a range of ways that students engaged with others' ideas in Ms. Kanzer's classroom.

Students' Opportunities to Learn Content

Up until this point, I have presented results focused on *how* students engaged with others' ideas. Equally important, however, is the potential of these instances of engagement to spur learning about subject matter content. I now turn my attention to *what* ideas students engaged with, which also sheds light on the ways in which engaging with others' ideas may have provided students with opportunities to learn subject area content. In doing so, I elaborate on one aspect of my initial definition of engaging with others' ideas; that engaging with others' ideas is focused on ideas about subject matter content.

In order to determine how engaging with others' ideas focused on ideas about subject matter content and shaped students' opportunities to learn subject-matter content, I analyzed the content from each of the 20 mathematical discussions and 25 literary discussions that were part of this study. In this analysis I listened to and read transcripts of each discussion in order to determine what content students had the opportunity to learn during the discussion, what students discussed and how students engaged with others' ideas during the lesson, and who made key contributions to the discussion. Specifically, I asked "How do students' engagement with others' ideas shape the opportunities that students have to learn content in one fifth grade classroom?" The results of this analysis are presented in Appendices J, K and L. In Table 7, I present a synthesis of my findings from these analyses.

Opportunities to learn subject area content. In Ms. Kanzer's classroom, students had many opportunities to learn subject matter content. Students' opportunities to learn content was shaped by a number of factors, including school environment, classroom environment, and curriculum. Frequent discussions and engagement with others' ideas also shaped students' opportunities to learn subject matter content. In particular, engaging with others' ideas provided students with opportunities to learn three important types of content: topics within each subject

matter, practices within each subject matter, and the nature of each discipline. In Table 7, I summarize what content students had the opportunity to learn in Ms. Kanzer's classroom. Then, in the pages that follow, I describe in greater detail what students had the opportunity to learn about subject matter topics and practices, and the nature of the disciplines as a result of their engagement with others' ideas.

Table 7. Opportunities to learn subject area content during discussions in Ms. Kanzer's classroom.

Subject Matter	Topics	Disciplinary Practices	Nature of the Discipline
Math	• Fraction equivalence • Comparing fractions • Division with fractional remainders • Operations with fractions	• Make sense of problems and persevere in solving them (SMP.3) • Argumentation: Constructing viable arguments and critiquing the reasoning of others (SMP.3) • Attending to precision (SMP.5) • Look for and make use of structure (SMP.7)	• Mathematics as a discipline of communication about others' ideas
Literacy	• The plot, characters, and themes of *Bud, Not Buddy* • What a literary essay is, and how to write one	• Analyzing in depth the characters, setting and events in a story (CCSS ELA) • Using evidence in support of ideas about text (CCSS ELA) • Determining the meaning of phrases and words using context (CCSS ELA) • Participating in collaborative discussions with diverse partners (CCSS Speaking & Listening)	• Literacy as a discipline of interrogating text.
Listening	N/A	N/A	N/A

Opportunities to learn about mathematics. As depicted in Table 7, students in Ms. Kanzer's class consistently had opportunities to learn about three distinct types of mathematical content: mathematical topics, mathematical practices, and the nature of mathematics as a discipline. Though some discussions presented more opportunities to learn one type of content than the other two, students often had opportunities to learn about all three of these types of mathematical content in a single discussion. In the sections below, I describe opportunities students had to use each of these forms of subject matter content. To illustrate these opportunities, I use examples from the Studying Amelia's Work (see p. 86-93) in addition to a number of other discussions.

Opportunities to learn topics in mathematics. In the months that I spent collecting data on teaching and learning in Ms. Kanzer's classroom, Ms. Kanzer spent nearly all of her instructional time in math on helping students develop understandings about fractions. Out of seven weeks of instruction, all but two of her mathematics lessons were about fractional content, and all 20 discussions were concerned with fractional content. Within the broad domain of fractions, discussions included topics such as fraction equivalence, comparing the relative size of fractions, adding and subtracting with fractions, and dividing while using fractional remainders. Often times these discussions included multiple of these areas of fractional content. For example, in one small group discussion Tim and Alonso were playing the game "Fraction Line-up." In the game, the students take turns drawing cards and placing them on a number line. At one point, Alonso realized that they had mistakenly said that 3/8 was greater than 2/5.

> Alonso: Oh my gosh, it's actually greater than this. A tenth is smaller than an eighth and that's one tenth away from being one half.
> Tim: No, it's not.
> Alonso: Yeah it is. 4/10 is equal to two fifths
> Tim: Hang on, hang on, hang on, hang on.
> Alonso: Okay let's figure this out.

Tim: What is the decimal of three eighths?
Alonso: I don't know. But hold on, look. Two fifths is equal to four tenths and it's one-tenth away from fifty percent.

In this sequence, Alonso uses his understanding of equivalent fractions to persuade Tim that 4/10 is larger than 3/8. Soon thereafter, Tim was persuaded by Alonso's work. This example shows that at times, engaging with others' ideas provided students with opportunities to learn multiple forms of fractional content. Of course, some of these topics naturally overlap; one Common Core State Standard states that 4th grade students be able to "Compare two fractions with different numerators and denominators, e.g. by creating a common denominator." Nonetheless, as seen in the examples above, engaging with others' ideas often provided opportunities for students to learn about one or more topics in mathematics.

Opportunities to learn mathematical practices. The frequent discussions in Ms. Kanzer's classroom allowed students the opportunity to learn a number of mathematical practices. One such practice was the practice of argumentation. Students explained their work to both the whole class and to partners. They then received feedback on these explanations from both their teacher and their peers. This meant that students had numerous opportunities to learn the mathematical practice standard "Construct viable arguments and critique the reasoning of others." The discussion of Amelia's work was one clear example of where students had opportunities to learn about the mathematical practice of constructing arguments and critiquing the reasoning of others. During this discussion, Amelia constructed an argument about how to solve 3½ - 1¾ = ___ through her work and explanation. Bobby and Haley then engaged with Amelia's idea, providing opportunities for students to learn to critique the reasoning of others.

Students also had the opportunity to learn a second mathematical practice: attending to precision. The following transcript from my field notes shows one example of how Ms. Kanzer coached students to attend to precision.

> Iris is presenting her solution to a "Problem of the Week" that Ms. Kanzer assigned for homework. Ms. Kanzer tells Iris to "Make sure to check in with your audience" before she goes to the board. Iris carefully explains that in order to subtract 3 and 5/8 minus 2 and 4/8, she turned all of the wholes into eighths. Before proceeding and answering the question, Iris asks the class "Does that make sense to everybody?" All students agree with the math, but Cassie has a suggestion. "Next time I think you should make the colors of the two numbers you're subtracting different from each other so that it's more clear," Cassie tells her. Iris agrees, then continues on her explanation. When she finishes, her work resulting in an answer of 1 and 1/8, she asks the class if anyone disagrees once again. When no one does, she heads back to her seat.

This instructional segment reveals how Ms. Kanzer taught students to attend to precision. At multiple points through almost every student's whole class explanation, Ms. Kanzer prompted students to ask if their work made sense. Students then began doing this independently, providing other students with the opportunity to learn to do this work. This is a further illustration of the opportunities to learn mathematical practices that were provided to students in Ms. Kanzer's classroom.

Opportunities to learn about mathematics as a discipline. Through repeated discussion of ideas, students had the opportunity to learn that communication is central to the discipline of mathematics. The frequency with which students responded to and referenced one another's ideas about mathematics – over 150 times during classroom discussions over the course of two months -- was perhaps the most important way that students had the opportunity to learn that mathematics was a discipline of communication. Yet particular instances of engagement with others' ideas also provided students with opportunities to learn about the discipline.

One example of this occurred during the Studying Amelia's Work discussion. After Haley asked Amelia whether subtracting fractions really worked, Ms. Kanzer said "Haley, that was really great how you asked that question and Amelia explained it to you. That's really important math work." Ms. Kanzer's comment that Haley had done "really important math work" by asking a question carried the message that asking questions is important to mathematics as a discipline. In this case, students' engagement with others' ideas over content provided an opening for Ms. Kanzer to comment on the students' interaction and the role of questioning in mathematics. This comment then provided an opportunity for students to learn about mathematics as a discipline.

Though this study does not focus on students' perceptions of Ms. Kanzer's class, initial evidence suggests that students in Ms. Kanzer's classroom recognized that mathematics was different in their classroom than it had been in their other years at the Sullivan School. In an interview, Rebecca commented "I like math this year because we get to work in small groups and talk about our work." Bobby noted "I like looking at what other students do and ask questions about it, and sometimes I use things that other people do." In other words, students may have recognized that the classroom discussions held in Ms. Kanzer's classroom provided unique opportunities to learn mathematics content.

Opportunities to learn about literacy. Students also had ample opportunities to learn about literacy as a result of how they engaged with others' ideas in their classroom. Similar to mathematics, students learned about topics in literacy, literary practices, and about the discipline of literacy through their efforts to engage with others' ideas

Opportunities to learn about topics in literacy. Opportunities to learn about topics in literacy primarily consisted of developing a deeper understanding of the characters and context

of the books that students studied. Since most classroom discussion revolved around the book *Bud, Not Buddy*, students mostly had opportunities to learn about this book. One example of this occurred during the Waiting in Line discussion (see p. 95). When Randy noted that the line at the shelter will need to close because "it's the Great Depression and they might run out of food because there are so many people," Randy provided students with the opportunity to more deeply understand *Bud, not Buddy.* Students also provided opportunities to develop a deeper understanding of *Bud, not Buddy* during small group discussions. During one discussion where students needed to respond to teacher-generated response questions, Tara and Dan engaged in the following series of talk.

Dan: Okay Page 101. How does the man persuade Bud to leave the bushes?
Tara: I'm pretty sure it's with food but I'll have to look.
Dan: Yeah, I'm pretty sure it's with food, too.
Tara: [Looks at the text] Yeah because he says ...
Dan: [Reads from text] "Oh yeah, and a big bottle of red pop." What is pop?
Tara: I don't know.
Dan: Something sparkling?
Tara: I guess so. It's probably some sort of soda.

I interpret this series of talk as providing Dan and Tara the opportunity to reinforce their understanding of how Bud was convinced to leave the bushes. Later on in the talk, Dan asks what "pop" is, which he and Tara figure out after a few turns of talk. In these cases, I view the students' engagement with each other's ideas as having provided them the opportunity to deepen their understanding of *Bud, not Buddy*. Students also provided information about literary essays when engaging with others' ideas in writing. Therefore, one area of content that students had the opportunity to learn about was information specific to the book or type of writing students were studying in Ms. Kanzer's classroom.

Opportunities to learn literary practices. Engaging with others' ideas in literacy also provided students with opportunities to learn about literary practices. One practice that students

learned about through discussions of *Bud, Not Buddy* was finding and using evidence to support one's idea. During one small group discussion, Calvin and Rebecca worked together to figure out what it meant when Bud's mom says "When one door closes, another door opens." The following discussion took place.

> Rebecca: Well it could mean when there's one solution to a problem that doesn't work, there's always another solution
> Calvin: Umm I'm not sure about that. What makes you think that?
> Rebecca: I don't know it just seems like it?
> Calvin: But there's no evidence for that?
> Rebecca: Kind of
> Calvin: Like where?

In this sequence, Calvin pressed Rebecca to provide evidence to support her interpretation, providing Rebecca the opportunity to learn that interpretations are more compelling and defensible accompanied by evidence. This was one of the more direct instances of students getting the opportunity to learn the importance of evidence through engaging with others' ideas. On other occasions, students worked together to provide evidence, engaging with others' ideas about what the best evidence might be in the process (see Appendix I).

Discussions and students' engagement with others' ideas within these discussions also provided Ms. Kanzer with opportunities to support students' learning to use evidence to support their ideas. In some of these discussions, Ms. Kanzer pushed students to provide evidence for their ideas by asking "What in the text made you think that?" [1-17] "Can you point us to a page where it shows that?' [2-2], or by framing the conversation through saying "You need to make sure to provide evidence directly from the text to support the answer you're giving your partner" [1-30]. During other discussions, students quoted from the text to support their ideas without prompting. In one ten-minute, student-led, whole-class conversation, students directed one another to specific page numbers five times, and read directly from the text on four of those

occasions [2-13]. This focus on evidence provided students with both explicit and implicit opportunities to learn about the importance of evidence when creating claims about text.

Another literary practice that students had the opportunity to learn about was participating in collaborative discussions of text. Appendix L outlines a number of opportunities that students had to learn to participate collaboratively in discussions. For example, Ms. Kanzer underscores that many ideas are important in a discussion, and students ask one another questions throughout the discussion. In essence, students had the opportunity to learn to engage in literary discussions by participating in them regularly.

Opportunities to learn about literacy as a discipline. Students' engagement with others' ideas also gave students the opportunity to learn that interrogating text is a central part of the discipline of literacy. Every day in Ms. Kanzer's classroom, students had the opportunity to raise questions about *Bud, Not Buddy* in either a small or large group setting. Alonso's initial question in the Waiting in Line discussion (p. 95) – why couldn't Bud just wait in line – is one example of this. Another example of this was when Vince raised his hand to ask a question during the last chapter of *Bud, Not Buddy* and the following sequence ensued:

> Vince: I'm kind of confused with what Bud's saying about time, like I don't really know what he's feeling right now or what he means.
>
> Ms. Kanzer: Okay, so you're asking the class for some help. You were kind of reading the book and saying to yourself "What's up with that?" That's great. Can someone help him out?
>
> Maggie: Well what he means by that is that he doesn't know what the country looks like or if the time is different there. He doesn't know that so it could be a different time, or it could be 3:00 or with the 12 or something.

Ms. Kanzer: Does anyone want to respond to that?

The implication of Ms. Kanzer's response to Vince's question – that asking questions about text is expected and desirable – is another example of how students had the opportunity to learn that literacy was not simply about the act of reading and writing. Instead, in Ms. Kanzer's classroom, students had the opportunity to understand that interrogating text with peers is central to literacy as a subject matter.

Listening. Students also participated in discussions and engaged with others' ideas in their unit of work on listening. Over the course of this work, students engaged in four discussions about listening where students engaged with others' ideas. During this unit, students did not have opportunities to learn that were rooted in subject area content. Though students undoubtedly learned something during this unit, what students had the opportunity learn specifically fell outside of the lens taken by my investigation of students' opportunities to learn.

Similarities and Differences in Engaging with Others' Ideas Across School Subjects

In the following section, I answer the questions "How is students' engagement in others' ideas similar across school subjects?" and "How does students' engagement with others' ideas differ by school subject?" I first examine the similarities between engaging with others' ideas by school subjects before moving to the differences. The results presented in this section rely on data analysis presented in Appendices J, K and L.

Similarities between school subjects. In a few distinct ways, students engaged with others' ideas similarly across subject matters. First, from a broad view, the ways in which students engaged with others' ideas were similar across subject areas. Students engaged with others' ideas and both responded to and referenced one another's ideas in each of the subject

areas. Furthermore, almost every specific type of response or reference – rephrasing another person's idea, answering a student question, etc. – occurred in both mathematics and literacy.

In addition to this broad-level similarity, I present two further similarities in how students engaged with others' ideas. First, students were more likely to engage with others' ideas in both literacy and mathematics when they brought prepared work to a discussion. Second, the ways in which students agreed with one another, disagreed with one another, and tried to understand one another's ideas sounded qualitatively similar in both math and literacy. I present these two similarities below. I present these similarities below.

Similarity #1: Preparing ideas as a precursor for EwOI. In Ms. Kanzer's class, students regularly prepared for classroom discussions. For example, in mathematics, students commonly worked with a partner or on their own to solve a problem before one student presented it to the class, leading to a whole-class discussion. In literacy, students prepared questions about the book they were reading on post-it notes for homework. The students then asked their peers the questions they had prepared while re-reading the text during small group and whole group discussions.

In both literacy and math, the class was much more likely to have a discussion where students engaged with others' ideas when students had done this preparatory work. In math, 16 of 20 discussions happened when students had solved a problem they were discussing in advance, while students had prepared questions for 19 of the 25 discussions that happened in literacy. This is not to say that students never had discussions unless they had prepared for them; students sometimes engaged with others' ideas without the aforementioned preparation. Yet the vast majority of classroom activities where students did not prepare did not result in a discussion, largely because students did not engage with others' ideas. When students played math games,

for example – a core part of the TERC Investigations mathematics curriculum – students rarely participated in a discussion. Student talk during these games more often focused on whose turn it was and the rules of the game than the mathematics at hand. In literacy, students less frequently engaged in discussions when Ms. Kanzer provided reading response questions that they were seeing for the first time than when students prepared their own questions. Thus, data suggests that students in Ms. Kanzer's classroom engaged with others' ideas more often when they had prepared for the discussion.

While the data from this study does not speak to why students engaged with others' ideas more often when they had prepared for the discussion, a number of explanations are possible. One possibility is that students were more invested in engaging with others' ideas when they had solved the problem or thought about the question on their own first. In math, for example, each student entered the discussion with a strategy they used to solve the problem. This would facilitate engagement with others' ideas, including trying to understand others' ideas, disagreement, and suggestions. If students were solving a problem together for the first time, however, it is possible that one student's thinking might dominate another's leading to less engagement with others' ideas. Although further research is necessary to pinpoint why students had often prepared before they engaged with others' ideas, the relationship between preparation and engaging with others' ideas was similar in both math and literacy.

Similarity #2: Agreeing, disagreeing, and trying to understand: Similar ways of engaging with others' ideas. Students agreed and disagreed with one another in similar ways in each subject area. Agreements with other students' ideas typically started with an affirmation such as "Yeah" followed by justification of why the student agreed with a previous student, or why they disagreed with another student. Similarly, disagreements with others' ideas most often

began with "But" or "I disagree" followed by a counterpoint. Table 8 [below] displays examples of how students agreed and disagreed with others' ideas similarly in mathematics and literacy, the two most common subjects discussed in Ms. Kanzer's classroom.

In addition to agreeing and disagreeing with others' ideas in similar ways across subject areas, students also tried to understand others' ideas in similar ways. When students shared ideas with one another, their peers often asked students to repeat their ideas or replied that they were confused and needed further clarification. Although the content of student's explanations were different by subject area, questions such as "What do you mean?" and "Can you say that again?" were commonplace in each subject. Table 8 displays examples of how students tried to understand others' ideas similarly in reading and mathematics.

Table 8. Similarities between ways of engaging with others' ideas in math and literacy.

Code	Math	Literacy	Similarity
Agreeing	Tim: I'm trying to figure out [this part of the problem]. Carlos: Oh [that part]? It's three sixteenths. No never mind, it's three thirty-seconds. **Tim: Yeah it's three thirty-seconds, cause that part is small.**	Calvin: How does the man persuade Bud to leave the bushes? Rebecca: It's mostly the food. He's got a big bottle of red soda and a sandwich and [Bud] gets out of the bushes because he wants food **Calvin: Yeah it's definitely the food.**	• Agreement noted by "yeah," or "yes" • Justification or elaboration typically follows agreement
Disagreeing	Bobby: Okay so I took one brownie and split it into sevenths **Dan: But that's really confusing, because one big square doesn't seem like seven brownies.** Bobby: My dad said it was a good strategy **Dan: But it doesn't make sense right?**	Tim: I think Bud's okay with his name, cause his mom chose it. Randy: I don't think Bud wanted his name, cause he gets made fun of for it. **Tim: But it's not like you can just choose your name when you're a baby.** **Randy: Yeah but he still cannot like it even if he can't choose it**	• Disagreement sometimes noted by "I disagree," but more often by starting with "but" and making a content-focused counterpoint • Disagreement followed by reasoning

Trying to Understand	Maggie: I know it's not bigger than five, because five times one is five and 7/8 is less than one. **Iris: I'm confused. Can you write it out more to show what you're doing?**	Gio: I think Bud thinks he's a vampire because they found the box **Tim: What do you mean, they found the box?** Gio: Like the box of that was at the back of the car. **Tim: But how does that show that he's a vampire?**	• Commonly begins with phrases expressing that students are confused or don't understand, followed by a question getting at the specific info they're looking for.

In sum, qualitative data analysis shows that student responses to one another sounded similar when they agreed with, disagreed with, or tried to understand others' ideas in each subject area. That said, significant differences emerged in how students engaged with others' ideas by subject area. I describe these differences below.

Differences between school subjects. Despite similarities outlined in the previous section, students engaged with others' ideas differently depending on school subject. I outline the four ways in which students engaged with others' ideas differently by subject matter in the sections below.

Difference #1: What students engaged with others about. In Ms. Kanzer's classroom, discussions often had a distinct purpose. In math, the most common purpose for discussions was to share the strategy one had used to solve a math problem, and to compare this strategy to the strategy of one's peers. In literacy, the most common purpose for discussions was for students to share their questions about the text and have these questions answered by their peers. Neither Ms. Kanzer nor students named the purpose of discussions in Ms. Kanzer's classroom, yet students regularly fell into the same types of discussion. Therefore, I use my interpretive lens as an observer embedded in the classroom context in order to name the purposes for discussions in

the classroom. I present these purposes in the table below, which relies heavily on data analysis recorded in Appendix J.

Table 9. Discussion purposes in mathematics and literacy

Math	# of discussions
Open Strategy Sharing: students share and compare strategies for solving a problem	8 discussions, all whole group
Representation Critique: students critique how a student represented their work visually	3 discussions, all whole group
Exploring a Generalization: students try to prove or disprove another students' generalization	1 discussion, all whole group
Shared Work: Students engage with others' ideas as they complete math problems or participate in math games	5 discussions, all small group
Guided Work: One student guides another student through solving a problem or reviewing their work	3 discussions, all small group
Literacy	
Student-Generated Question Discussions: Students share questions about *Bud, Not Buddy,* other students answer their questions	6 whole group, 3 small group
Teacher-Generated Question Discussions: Students work together to answer reading response questions given by the teacher	1 whole group, 5 small group
Inventing Chapter Titles: Students invent chapter titles for *Bud, Not Buddy*	2 small group
Discovering the Meaning of "Accountable Talk": Students dissected the words accountable talk in order to figure out its meaning	1 whole group

As depicted in the table above, students engaged in discussions that had a variety of purposes. Importantly, these purposes seemed to influence the ways in which students engaged with others' ideas in literacy and mathematics. For example, in math, students regularly engaged with others' ideas about *how* they solved a given problem. This type of engagement was

facilitated by the structure of "open strategy sharing" discussions, one of which was the Amelia's work discussion presented previously. In open strategy sharing discussions (described in Kazemi & Hintz, 2014), one student shared their strategy for solving a problem, and other students commented on how they solved the problem.

On the other hand, in literacy, students rarely engaged with others' ideas about *how* they approached a question or part of text. Instead, what students engaged with others' ideas about in literacy was often guided by the purpose of the discussion: to answer questions that students or the teacher asked about the text. Therefore, engagement with others' ideas in literacy focused on students' interpretations of the text itself, including why characters such as Bud and his mom made the choices they did.

Students also engaged with others' ideas about different topics when working in small groups in math and literacy. During small group mathematics work, students solved problems together and discussed how to solve problems or whose solution was correct as these differences emerged. These were not topics that students engaged with in literacy; instead, students answered their or the teacher's questions about the text after they had already read a new chapter of the book. This is a further example of how the purposes of discussions in math and literacy created differences in what students engaged with others' ideas about in these two subject areas.

Difference #2: Staying with one idea in math, engaging with many ideas in literacy. I found that while students engaged with others' ideas in both literacy and math, they engaged with fewer ideas for a longer period of time in mathematics than they did in literacy. In other words, episodes of talk – talk about a single topic – lasted longer in math than they did in literacy. In whole class discussions in mathematics, the class tended to discuss one student's work at a time, students would repeatedly asked questions of that single students' work. For

example, a discussion about Calvin's work on the Bicycle Race problem lasted over 8 minutes and focused exclusively on his work. During the discussion four students commented on his work, and Ms. Kanzer kept the class' attention focused on Calvin's work with questions such as "What other feedback do we have for Calvin." Ms. Kanzer regularly sustained students' discussion about one idea in other math discussions. When students tried to change the topic, Ms. Kanzer often interrupted with comments like "Is this on the same idea? Let's stick on this idea" and "Remember we're thinking about Cassie's work, not anyone else's work." As a result, students discussed single ideas for longer amounts of time in math than in literacy. In literacy, students were more likely to discuss a number of ideas over the course of one conversation. For example, students' talk about whether students waited in line (p.95) lasted about 3 minutes and was immediately preceded by a discussion of what the author meant by "Aww shucks," an episode of talk that lasted about 2 minutes, and immediately followed by a discussion about why a character slapped Bud in line, an episode of talk that also lasted 2 minutes. The brevity of episodes in literacy was partly determined by the structure of the discussion, as students were always armed with many sticky notes and reading response questions rather than studying a single idea. Nonetheless, it was notable that students engaged with more ideas for shorter amounts of time than they did in math.

Difference #3: Greater focus on argumentation and communication in math. In both math and literacy, students constructed arguments. In math, however, students were more likely to comment on how other students made their arguments or offered their ideas, rather than exclusively focusing on the content of their ideas. One example of this was the many suggestions students made to one another about labeling their work, which I interpret as a visual argument. In

the discussion where Calvin presented his work about the Bicycle Race problem, Alonso raised his hand to tell Calvin the following:

> Alonso: I think he should show how many eighths there are. He should do a little line to symbolize all of them, because that would be more clear.

Alonso justified his suggestion by saying it would be more clear, implying that Calvin's communication with the class and the way he constructed his argument was worthy of comment. In three full discussions, most student comments were about other students' argumentation, and comments of this type were also scattered throughout other mathematical discussions. Though a few literacy discussions focused on students' evidence, outside of these discussions students almost never commented on how each other presented their ideas. Ms. Kanzer's comments mirrored this pattern; she put much more emphasis on how students constructed their arguments in math than she did in literacy.

Difference #4: How students engaged with others' ideas. Finally, students engaged with others' ideas in different manners in math, literacy, and listening. An examination of the differing frequencies of the specific ways in which students engaged with others' ideas makes clear that the character of students' engagement with others' ideas was different across subject areas. I present these differing frequencies in Table 10 before separately analyzing the manner in which students engaged with others' ideas in each of these three subjects.

Table 10. Code counts by school subject, engaging with others' ideas

n = 419 instances of engaging with others' ideas

Parent and Student Codes	Total	Math	Literacy	Listening
Responding to others' ideas	331	131	160	40
Adding on	69	5	54	10
Trying to understand others' ideas	65	46	16	2
Agreeing	54	4	40	8
Answering a student question	43	5	38	0

Disagreeing	36	18	10	8
Critiquing	29	17	6	6
Making suggestions	23	20	1	2
Complimenting	7	7	0	0
Prompting another student	5	4	1	0
Referencing others' ideas	88	53	21	14
Explaining or rephrasing	27	15	7	5
Connecting to other students' ideas	24	15	5	4
Contrasting with another student's ideas	21	12	6	3
Referencing an idea from a previous day	16	11	3	2

Math. Students in Ms. Kanzer's classroom engaged with others' ideas differently in mathematics than they did in other subjects. Students most often tried to understand others' mathematical ideas, engaging with others' ideas in this manner 46 times during discussions that occurred during data collection. As previously discussed, these attempts to understand others' ideas included questions posed to peers and statements such as "I'm not sure what you mean by that." Attempts to understand one another's work in math most commonly occurred during whole class discussions where students studied one another's work. Ms. Kanzer commonly prompted students to tell their peers they didn't follow what they were saying, and attempts to understand their peers' ideas quickly followed.

Students viewed others' work with a more critical lens in mathematics than they did in other subjects. Students critiqued, disagreed with, and made suggestions about their peers' work much more frequently in mathematics than they did in other subjects. Almost ninety percent of the suggestions students made about others' ideas occurred in the context of discussions about mathematics. About two thirds of the critiques and 50% of instances in which students disagreed with one another's ideas occurred in mathematics. These episodes of constructive criticism occurred most frequently while students were studying one another's work, but also happened

when students checked their answers with one another and worked in small groups. Students often offered critiques and suggestions in tandem, as students who critiqued others' mathematical thinking often had ideas for how others could improve their work as well.

Finally, students referenced others' ideas more frequently in mathematics than they did in literacy or in listening. These references were evenly distributed among the four types of references identified in this study. Though explaining and rephrasing others' ideas was most often prompted by the teacher through questions such as "Can someone rephrase that idea?" Connecting, contrasting and referencing ideas from previous days all arose from conversation without teacher prompting.

Literacy. Students responded to one another's ideas slightly more often in literacy than they did in mathematics. In discussions during reading and writing, students more frequently "added on" to one another's ideas than they did in other subject matters. Many of these instances of adding on occurred during small group conversations about *Bud, Not Buddy* where students shared sticky notes they'd written with one another or answered reading response questions. Students added on to one another in quick succession, with students taking up and elaborating on one another's ideas about characters and their motivations. Some of these instances of adding on used the exact words "adding on," while in others, students simply made points that built on the ideas of others. For example, one section of a conversation between Dan and Tara about *Bud, Not Buddy* proceeded as follows:

> Tara: (reads question) What does Bud lie about and what does he hope to gain? I think he relies too much on lying.
>
> Dan: Well, what he hopes to gain by lying isn't right
>
> Tara: Yeah, you could say though, he's trying to make a better life for himself

Dan: Yeah he should only lie if it's really going to help him. He seems almost too proud of how he's lying and how he lies.

Tara: Yeah. He's like, "yeah I live in the Grand Rapids," and he keeps bringing it back there. And then at the end of the chapter it said, he's going there in like a day. So if he wanted to go again he had to stay with that guy for a day.

Dan: The guy is obviously going to get suspicious because if he takes him there, Bud won't know Grand Rapids, and he won't really know where he lives.

Discussions such as the above, where students developed ideas with one another, were unique to reading and writing. Unlike in mathematics, in which students mostly evaluated one another's ideas and answers, students spent time generating ideas through adding on to one another in literacy.

Students also agreed with one another's ideas far more frequently in literacy than they did in mathematics. As noted previously, agreements sounded similar across subject matters, but students more often acknowledged that they agreed with one another's ideas in literacy than they did in math. This finding contrasts with mathematics, in which students more often disagreed with, critiqued, and made suggestions about others' ideas.

Finally, students were more likely to ask and answer one another's questions in literacy than in other subjects. This way of engaging with others' ideas was supported by assignments where students were asked to generate questions on sticky notes, then shared them with their partners or the whole class. That said, students also more frequently made comments such as "I wonder" or "I bet" that their partners responded to. These contemplative comments illustrate how students spoke with less certainty in literacy than they did in mathematics. Part of the reason this was the case was students often asked questions about what was going to happen next in the

book, in which case students would make predictions based on the information at hand rather than certain knowledge of what would occur.

Listening. As Table 9 suggests, students engaged with other students' ideas far more frequently in mathematics and literacy than in their work on listening. This is in large part because there were fewer class periods devoted to listening, but also because these class periods only infrequently featured discussions. Students commonly worked in small groups in listening, and on a few occasions, student held discussions where they responded to and referenced others' ideas. These responses and references included adding on to other student, disagreeing and agreeing with other students, and critiquing their work. It did not include asking other students questions or prompting their thinking, and trying to understand others' ideas happened infrequently in listening. With fewer instances of engaging with others' ideas overall, no clear patterns emerged for how students engaged with others' ideas during their work in listening.

Summary note: Similarities and differences in engagement with others' ideas by subject area. In this study, I asked how students engaged with others' ideas similarly and differently by subject area. Results from Ms. Kanzer's classroom suggest that some broad similarities existed in how students engaged with others' ideas across subject areas. In both math and literacy, students were more likely to engage with others' ideas when they had prepared ideas before the discussion, and in both subject areas students agreed with, disagreed with, and tried to understand others' ideas in ways that were similar. At the same time, important differences existed between engaging with others' ideas in these two subject areas. Perhaps most importantly, the different purposes of discussions in mathematics and literacy led to students engaging with others' ideas differently in these subject areas. Second, students engaged with single ideas for long stretches of time, while in literacy students tended to engage with many

students' ideas over the course of a discussion. Third, more of students' engagement with others' ideas was focused on argumentation and communication in mathematics than in literacy. Finally, students engaged with others' ideas in different manners in math and literacy. Two of the major differences were that students critiqued one another's ideas more often in mathematics than in literacy, and spent more time developing ideas together in literacy than they did in math.

It is likely that Ms. Kanzer, and the culture she created in her classroom, played a role in the differences between how students engaged with others' ideas in math and literacy. In Chapter VI, I will explore Ms. Kanzer's role in supporting students' engagement with others' ideas, while in Chapter VII I will bring Chapter VI into conversation with the scholarly literature in discussing how Ms. Kanzer may have precipitated some of the differences in how students engaged with others' ideas in literacy and mathematics.

CHAPTER V

Status and Authority in How Students Engaged with Others' Ideas

Regardless of subject area, issues of status and authority played a role in how students engaged with others' ideas in Ms. Kanzer's classroom. In order to explore these dynamics, I more closely examined discussions in which negotiations of power and authority were particularly clear. In doing so, I relied on the case selection rationale of existing literature on socially-constructed authority. Langer-Osuna writes that she chose to examine cases that had particularly clear power and authority implications in order to "make visible what may be occurring among students more generally, albeit in subtler ways" (Langer-Osuna, 2016). I also lean upon Langer-Osuna's criteria for selecting cases where power and authority were clearly at play. She notes that these cases are recognizable through their "few attempts to make sense of one another's ideas, but many attempts to control the collective work socially and intellectually" (Langer-Osuna, 2016). Following this example, I looked for cases where students controlled other students' work. Among my available codes, I ruled out interactions where students tried to understand others' ideas, but specifically looked through discussions where students repeatedly disagreed, critiqued, or made suggestions about one student's idea. I interpreted these repeated disagreements, critiques and suggestions as signs that students were attempting to control a peer's work and positioning the peer and their work as lacking power and authority (e.g., Langer-Osuna 2017). I found 12 discussions that met these criteria for discussions where power and authority were clearly at play. These discussions, and the ways in which they implicate status and authority, are catalogued in the table that follows.

Table 11. Discussions with status and authority implications.

Date, Subject, Type	Discussion Synopsis
1-8, Math, Whole Class	When Tara shares a mathematically valid way to share 7 brownies among 5 people, a variety of students **repeatedly critique** her work.
1-11, Math, Whole Class	Maggie shares how she got one answer initially then revised her work. Bobby **repeatedly critiques** her decision to share this information with the class.
1-19, Reading, Small Group	When Sorah and Bobby work together as reading partners, Sorah criticizes Bobby for not focusing. She **disagrees with all** of the ideas that Bobby poses.
1-25, Reading, Whole Class	Amariah shares her answer to a reading response question and **Dan and other students critique** it based on the idea that it doesn't answer the question. The teacher ends up siding with Amariah.
1-29, Reading, Small Group	Gio **repeatedly disagrees** with the ideas Randy offers about whether a character likes his name. The teacher also critiques Randy's work. Randy's ideas are valid interpretations.
2-1, Writing, Small Group	Calvin tries to persuade Rebecca that his answer is correct. When she haltingly provides her thinking, Calvin **disagrees, insists his answer is correct, and shares his idea** as the idea they agreed upon together.
2-2, Listening, Small Group	Two groups have brainstormed ideas for how to measure the sound in the cafeteria. When Bobby shares his groups' ideas with Calvin and Rebecca, Bobby's ideas are **immediately critiqued** and dismissed.
2-5, Math, Small Group	When Carlos presents his depiction of 7/8, Bobby **repeatedly critiques** Carlos's picture for not having even eighths. Carlos, exasperated, finally tells Bobby to stop focusing on a small detail.
2-12, Math, Small Group	Bobby and Dan work together on the Tupelo Township problem. **Dan is skeptical of and disagrees** with most of Bobby's ideas, from getting a calculator to his answers to a few parts of the problem.
2-13, Listening, Whole Group	Students discuss where "no calling out" should be in their listening rubric. Haley shares what she thinks but Vince disagrees. **Five students strongly agree with Vince and disagree with Haley.**
2-14, Math, Whole Group	**Many students in a row make suggestions** about how Calvin can improve his work. Calvin sits quietly and does not respond.

Themes from pertinent discussions. I identified the 12 discussions listed above in order to examine how issues of status and authority shaped students' engagements with others' ideas. Though I am unable to make causal claims, I saw a number of patterns in these 12 discussions that speak to the effect of status and authority on how students engaged with others' ideas. I present these themes below.

Theme #1: Students frequently made quick decisions about the quality of their peers' ideas. In a number of the 12 discussions, students made quick decisions about the quality of their peers' ideas. This was true in all three of the case study discussions presented above. When Bobby suggested that he and Dan start by measuring Krebs' square, Dan assumed that Bobby was copying the work of another group and dismissed his idea out of hand. Gio decided almost immediately that Randy's interpretation of Bud's feelings about his name was incorrect. Finally, when Tara presented work that contrasted with other student, multiple students criticized her work before trying to understand it. In other words, students reacted to their fellow students' ideas – sometimes negatively – from the moment the ideas entered the conversation.

Theme #2: Student identities may have played a role in the influence of status how others engaged with their ideas. Though these quick reactions to the quality of other student ideas shed some light on my question of interest, scholarly literature in this area suggests that status and authority vary based on the identities of students that are involved. In order to understand whether students reacted differently, I asked five students I interviewed whether they listened to some students' ideas more than others. Each student replied that no, they listened to all of their peers' ideas equally. Setting this aside, I looked further into the discussions at hand to try to discover patterns in who was involved in these discussions. One pattern I noticed is that in four of the five whole group discussions where status and authority are implicated, male students

repeatedly critiqued female students' ideas. In these discussions, the female student presented ideas that were different from those of their fellow students, such as Tara's strategy for sharing brownies. I also noted that students more often disagreed with Randy, a male student who was frequently pulled out of the class for special education services, than they did with other students. Though I do not mean to imply that these students' work was necessarily critiqued *because* they were female or received special education services, these patterns are nonetheless pertinent to the research question at hand.

Theme #3: The classroom teacher influenced the ways in which socially-constructed authority shaped students' engagement with others' ideas. In Ms. Kanzer's classroom, students often worked in small groups, which meant that the teacher was not present for many small group interactions where issues of status and authority were at play. However, during many of the whole group conversations where issues of status and authority arose, Ms. Kanzer intervened, which influenced how students engaged with others' ideas going forward. In the third case study presented below, Ms. Kanzer defended Tara's thinking by encouraging students to try to understand her work. Ms. Kanzer also intervened on behalf of Haley when she was repeatedly criticized for presenting a mistake, interjecting that Haley was "doing a great job" explaining how she revised her work. Ms. Kanzer regularly intervened in ways that were intended to redistribute authority to the student being critiqued.

On the other hand, Ms. Kanzer also exacerbated differences in status and authority during some discussions. In the second case study presented below, Ms. Kanzer told Randy he was "doing the wrong thing," thereby added to Gio's authority at the expense of Randy. In the conversation where Calvin was critiqued by a number of students (see Table 10), Ms. Kanzer also critiqued Calvin, adding to the chorus of pointed criticisms of his work. That said, Ms.

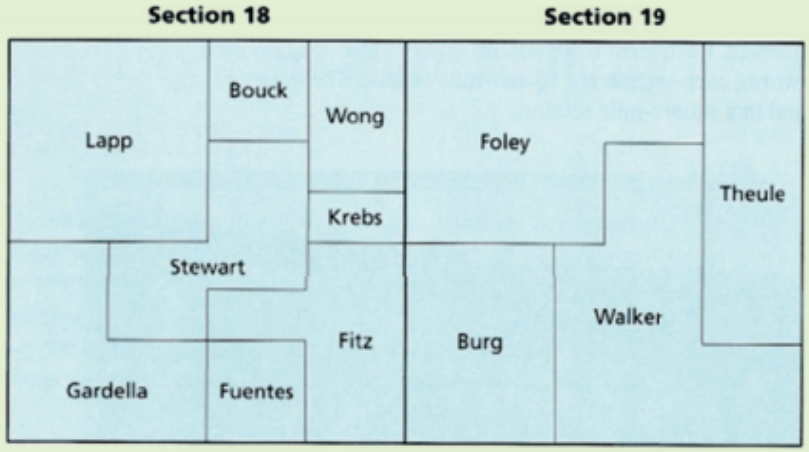
Kanzer may have sensed that Calvin carried authority, and that his confidence and status in mathematics would be high even if she added on to others' criticisms. In summary, when issues of status and authority arose in whole class settings, Ms. Kanzer's interventions played a role in how these issues affected students' engagement with others' ideas.

Revelatory cases: Illustrating how status and authority influence how students engaged with others' ideas. In order to illustrate how status and authority shaped students' ideas, I present three revelatory cases in which students assumed unequal levels of authority, and explain how these discussions may have been influenced by students' status. I selected these cases because they illustrate the three themes that emerged from the 12 discussions that I identified and analyzed. I also intentionally chose cases that varied by subject matter and group size. In each of the three cases I present, I separate raw data (descriptions and transcripts of the interactions) from my interpretations of the data. I most often present my interpretations after I present transcripts of raw data.

Status & authority case #1: Bobby, Dan & the Tupelo Township problem. One day in late February, Ms. Kanzer presented to the class a problem she called the Tupelo Township problem. This problem is depicted below in Figure 17. In the problem, students were asked to find what fraction of a 640-acre section of land each person owns. Students then worked with partners for the next 20 minutes of the period.

Figure 17. The Tupelo Township problem

When Tupelo Township was founded, the land was divided into sections that could be farmed. Each section is a square that is 1 mile long on each side. In other words, each section is 1 square mile of land. There are 640 acres of land in a square-mile section. The diagram below shows two sections of land that are *adjacent*, or side by side. Each section is divided among several owners. The diagram shows the part of a section that each person owns.



Source: Adapted from Lappan et al. (2006)

1. What fraction of a section does each person own? Explain.

Ms. Kanzer partnered Bobby and Dan together. As they began work on the rug, the following discussion ensued.

Dan: Okay. So what are we trying to do?

Bobby: I don't know. This is algebra. I don't know how to do this.

Dan: Well we're trying to find out how much each landowner has. We're going to figure this out.

In this exchange, Dan positions himself as knowledgeable and capable of figuring out the problem even after Bobby identifies it as "algebra," while Bobby positions himself as less knowledgeable and capable. Another way to interpret this interaction is that even from the start of their group-work, Dan and Bobby positioned themselves with different levels of confidence

and authority. These different levels of authority may have been constructed over the course of the school year in Ms. Kanzer's class, or throughout their time at Sullivan School.

Next, Dan read the problem aloud. After Dan finished reading, Bobby left to get a calculator and ruler. As Bobby left to secure materials, Dan began work on the problem. He made a few dotted lines, sectioning off the squares into smaller pieces. As Bobby returned, Dan called for Bobby's attention and presented how he wanted to begin the problem.

Dan: Hold up Bobby, watch this. We could make squares out of this.

Bobby: Huh?

Dan: We could make several squares. Like this could be a square…

Bobby: I think we should use Krebs.

Dan: What would using Krebs do? Don't just copy what they're saying [gesturing to another group]

Bobby: No actually! I was thinking that before.

In this interaction, Dan and Bobby both offer ideas for how to begin the problem. Dan's idea is to subdivide the square into smaller squares, in essence creating a common denominator that can be used to determine and compare the size of each plot. Mathematically, Bobby's proposal is similar to Dan's idea. In choosing Krebs, the smallest square, Bobby chooses the smallest plot of land, one that will fit into all the other squares, allowing the student to create a common denominator. Despite the similarity of their plans, Dan dismisses Bobby's plan and accuses him of copying another group's idea. In this interaction, Dan once again assumes a position of authority, and in the process fails to recognize Bobby's mathematically valid contribution.

Bobby then proceeded to measure Krebs' square, and explain to Dan that it was 3 and ½ centimeters wide and 1 and ½ centimeters going up. But Dan disagreed with Bobby's approach

to the problem. “You’re doing it wrong,” Dan said, “You’ve gotta do it with squares.” Eventually, Bobby was convinced. “Okay, that’d be too hard,” Bobby conceded. Dan told Bobby to read the next section aloud. After Bobby had finished, he paused for a minute, then reacted.

Bobby: This is pretty hard. This is impossible. This is algebra. Kill me now!

Dan: You have a fixed mindset. You’re not trying!

Bobby: Yeah, I am!

Dan: No, you’re not, you have a calculator already. Put the calculator down, you have no idea how to use it on this problem.

In this part of the discussion, Bobby expresses that he is unsure of how to solve the problem and that the problem may involve advanced math that he does not understand. Rather than reassuring Bobby, Dan accuses Bobby of having a “fixed mindset,” “not trying,” and not understanding how or why to use a calculator. Instead of engaging with Bobby’s ideas about using the calculator and perhaps trying to find out more about them, this exchange is another example of the ways in which Dan dismissed Bobby’s thinking throughout their work on the Tupelo Township problem.

After the exchange described above, Bobby put the calculator down while Dan wrote on their shared packet. Bobby looked around and chimed in on another groups’ conversation before turning back towards Dan. Suddenly, Bobby blurted out a mathematical claim.

Bobby: Actually, I see that Lapp is ¼.

Dan: Yeah, exactly

Bobby: Oh, I’ll write it down then.

Dan: Dude, I can write it down.

This exchange shows that unbeknownst to Dan, Bobby continued to think about how to solve the problem as Dan tried to solve the problem with pencil in paper. Bobby did this work without using a calculator and despite the doubts about his own abilities that he had expressed earlier. When Bobby offered to contribute by writing down his conclusion, Dan rejected Bobby's attempt to contribute to the group's written work by telling Bobby that he would write the answer down.

After figuring out the size of Lapp's plot, Bobby turned away again to look at other groups. At one point, Bobby got another group's attention. He told the group he and Dan had figured out Ladd and it was "pretty easy." Bobby then turned back to his paper and looked at it for about 30 seconds. Then he turned to Dan again.

Bobby: Oh, I think I figured out what Gardella was - 3/8. No I mean 3/16.

Dan: Well Krebs is 1/8. I did the math.

Bobby: What? There's no way! It's got to be at least four down to be 1/8.

Dan: Yeah it is. I just did it!

Rather than continuing the debate, Bobby moved along to another square – Bouck.

Bobby: Bouck would be 1/16, and Fuentes would be the same

Dan: I don't think so

Bobby asked Dan to measure both Bouck and Fuentes. Dan discovered that Bobby was correct; Bouck and Fuentes were the same size.

In this exchange, Bobby builds on his success in finding the size of Lapp's plot by correctly identifying the relative sizes of Gardella, Bouck, and Fuentes' plots. Each time he presents his answers to Dan, however, Dan either expressed skepticism about Bobby's answers or moved the conversation on to looking at another square. To be fair, Bobby provided limited

justification for his answers and did not record his work on paper. Yet it was clear that Dan seemed to react both quickly and negatively to Bobby's solutions, rather than taking the time to investigate their accuracy.

The boys continued to work for the next ten minutes, figuring out a few more squares before Ms. Kanzer rang the bell to signal the end of whole-class work.

Status & authority case #2: Gio, Randy & Bud's name. Students sat next to their reading partners as Ms. Kanzer introduced a reading response question that students would write about that day. Oscar read the question aloud to the class -- "How does Bud feel about his name" -- then Ms. Kanzer asked students to take 5 minutes to answer the question in their reading partnerships.

Gio turned to Randy and began. "I don't think he really cares about his name," Gio started, "cause on the page it says he just says 'Yes, Mama,' so I think he knows his name is Bud and he's just getting bored of it."

After a pause, Randy offered a contrasting idea. "I think, umm, I think Bud wanted to be named Bud and not Buddy because he wanted his name to be all tough and mean, because the name Buddy sounds kind of young, or weak."

Randy's claim was defensible. Bud, the main character in the book, was an orphan who had bounced from one foster home to the next, and had regularly been picked on by a foster sibling. But Gio interrupted Randy to disagree.

Gio: He doesn't want to be so mean

Randy: Well he wanted his name to be like so nobody would bully him.

Presented with Gio's challenge in the quote above, Randy revised his idea to make it more closely adhere to the text. Yet Gio continued his opposition.

Gio: No, the mom wanted the name to be Bud.

Randy: Yeah, but the mom didn't really understand.

Gio: Well you can't really choose your name when you're 2 years old!

Randy: I know but I think Bud's like if I got a little bit better name than Buddy than that guy wouldn't pick on me.

In this exchange, Gio pivots his opposition to Randy's idea by arguing that the mom chose the name Bud, not Buddy. Gio frames his comments in contrast to Randy's idea, implying that Randy's idea that Bud doesn't like his name is inaccurate. In reality, however, Randy's idea successfully answered the question "How does Bud feel about his name?" while Gio's argument that Bud's mom chose his name does not pertain to the question at hand.

The exchange continued for about another minute. Randy explained his idea again while Gio maintained his resistance. At one point, the boys turned to textual evidence to support their debate. Gio read a line on the first page aloud. Another character asked the main character "Are you Buddy Caldwell?" and he responded "It's Bud, Not Buddy, ma'am." Randy integrated this supporting evidence in his claim.

Randy: See, that sounds like he's a little bit frustrated about his name.

Gio: Yeah, he doesn't want people calling him other names.

Randy: I know.

Gio: It's like if I called you "Jack." Would you like that? And your real name was Randy. No, I don't think you would.

Randy: (laughs) I actually would. Jack's a popular name in my family.

One interpretation of this exchange is that it reveals a difference in how Randy and Gio understand the question. In this view, Randy sees the main character's name as Bud *or* Buddy,

and argues that Bud doesn't like either name. Gio sees the main character's name as *Bud* only, so when someone calls him Buddy, this is as much the main character's name as "Jack" is Randy's name, to use the example at hand. To Gio, the name *Buddy* is inaccurate and has little bearing on the question of whether Bud likes his name. Unfortunately, the boys do not surface this difference in how they understand the question. Alternatively, Gio may have simply been continuing his oppositional stance towards Randy's ideas.

After Randy and Gio's exchange had been ongoing for a couple minutes, Ms. Kanzer approached. She asked the boys whether they'd given answers, and both responded yes. "Now you have to go to the paper and point with your finger to where the evidence is to support the answer you just gave. Point to where the evidence is," she continued, drawing out the word "evidence" into its three syllables for emphasis. As Ms. Kanzer left, an idea occurred to Randy. He let out a loud, excited "OH!" before turning to Gio.

> Randy: Maybe Bud's mom liked flowers a lot, like the flower bud. So then after since people think it's Buddy because they don't think of that. And when you're a-d-o-p [spelling out adopted] it's hard, you know what I mean? People really don't know you that much cause you can't really do anything, and they might change your name. When you're adopted you go to school, you go back to the adoption home, you go do your work, and then you do something, you can't leave your adoption home, only if it's for school or school work. It stinks, and that's why the mom might call him that.

Randy's idea did not respond directly to the question at hand about how Bud felt about his name. At the same time, Randy's idea showed some analysis of the mom's motivations, and empathy towards Bud's situation in life. Later, Randy found a passage that supported this idea. Yet when

Ms. Kanzer came over again after hearing his idea, she turned to Randy and addressed him in an exasperated voice.

> Ms. Kanzer: Okay, listen to me Randy. That's how his mom feels. You're pulling the wrong evidence. You need to pull evidence of how Bud feels. You can't pull evidence from what the mom says to tell me that's how Bud feels. On this side I want you to point with your finger to show evidence of what Bud is thinking, or saying, or doing. Go. Okay. Together, find evidence for how Bud feels, not his mom. Work together. It's helpful if two people are doing it.

In responding to Randy's latest idea with exasperation, Ms. Kanzer positioned Randy's idea as lacking merit. She underscored this evaluation by emphasizing that Randy was pulling the "wrong evidence." Though pointing to evidence "with your finger" may be a strategy intended to help Randy, it may also be received as patronizing and contribute to positioning Randy negatively in his work with Gio. Finally, Ms. Kanzer's comment that "It's helpful if two people are doing it" may suggest that Randy needs Gio's help in order to attain a correct answer.

After her comment, Ms. Kanzer left to tend to another group. Gio and Randy dutifully searched for alternate evidence. A few minutes later, Ms. Kanzer rang the bell to convene the group for a whole-class share.

Status & authority case #3: Returning to Tara's Two-Hundred Hundredths. One of the more salient examples of students engaging with others' ideas in Ms. Kanzer's classroom occurred when Tara came up to the board to share her strategy for sharing 7 brownies among 5 people. Yet this discussion also brought to the fore issues of authority.

After two students had already shared their solution to the problem, Ms. Kanzer asked for a share from someone who had a "different idea or concept." Tara raised her hand. She proceeded

to explain that she divided each leftover brownie into hundredths because "a lot of smaller pieces would help make the fraction equivalent" and that she would then have "forty two-hundredths which would be equivalent to four tenths." In between the beginning and end of Tara's explanation, Ms. Kanzer prompted students to "lean in" and pay attention to Tara's work since it was different from how most people did it. Despite Tara's mathematically valid explanation and the positive positioning of her work by Ms. Kanzer, when Tara asked for comments she received the following responses:

Bobby: I am not following with what you're saying because you're talking very fast.

Tara: Rebecca?

Rebecca: I'm confused because I don't understand a single word that you just said.

Tara: Oscar?

Oscar: Isn't that kind of long and…it doesn't seem efficient

Tara: I found it easier just dividing the brownies into many parts

At face value, Bobby and Rebecca's comments that Tara is talking too fast seem to be important if non-mathematical critiques of her explanation. Yet Tara seemed to speak no faster than other student who shared. In addition, Bobby, Rebecca and Oscar chose to critique Tara's presentation rather than compliment the originality of her work; during an earlier share, Bobby told Carlos he "hadn't thought to do it that way," a comment that easily could have applied to Tara's work.

After these critiques, Ms. Kanzer gently asked Tara "Would you mind starting again and talking slowly and pointing to the picture while you're talking?" Tara started by saying that "Since I only have two brownies left, I can divide both into hundredths, so I have two hundred hundredths." Then she paused.

Tara: Questions or comments? Iris?

Iris: I feel like it's repetitive because you just keep dividing.

Tara: Yeah that's why it's easier

Iris: Oh okay.

Here, Tara is criticized again even after explaining her thinking again in a direct manner. This marks the third successive student to criticize Tara's work, albeit along different lines than other student' critiques. Rather than aiming her comment toward Tara's explanation, Iris critiques Tara's strategy at large, calling it "repetitive," implying that the strategy lacked value.

After Iris, the next student to speak was Calvin.

Calvin: Why did you split it into hundredths if there were five people?

Ms. Kanzer: Ahh, interesting question.

Tara: Because 100 is easily divisible by 5.

Calvin: Oh yeah.

In this exchange, Calvin asks a question that is less critical than others. Unlike the other questions, Ms. Kanzer offers approval of Calvin's comment.

After Randy raised his hand and participated, Ms. Kanzer intervened again, making her efforts to positively position Tara's work more clear.

Randy: It sounds like you're saying you basically cut the brownie into two hundred pieces exactly, like 100 pieces in each little brownie, and I mean, that's not really…

Tara [interrupts]: I'm trying to be mathematically realistic, not logically realistic, because in real life you can't cut a brownie into hundredths

Randy: Yeah, I mean, the way you said you can cut up the brownies into two-hundred hundredths, that's typically impossible, and that's basically a waste of the brownie.

Ms. Kanzer: No, that's all right. I want to reiterate what Tara said, that she's being mathematically realistic. So, can you all see the math in what she did?

Tara: Yeah, I cut each brownie into hundredths.

In this sequence, Ms. Kanzer comes to the defense of Tara after Randy critiques Tara's work for not being logically realistic. By asking students to "see the math" in what Tara did, Ms. Kanzer positions Tara's work as mathematically valid and worthy of study.

After Ms. Kanzer positioned Tara in this positive light, Tara finished her explanation. When Ms. Kanzer asked for final comments for Tara, Bobby raised his hand and said "At first I didn't know what Tara was talking about, by now I understand much more what she means."

This comment from Bobby, which closed the class' study of Tara's work, may suggest that the class' probes into Tara's thinking were necessary in order for them to understand Tara's work. On the other hand, the sequence of Bobby's comment after Ms. Kanzer's intervention on behalf of Tara may not have been a coincidence. With students positioning Tara negatively, Ms. Kanzer's support of Tara may have contributed to Bobby's ultimately positive view of Tara's work.

Socially-Constructed Authority and Students' Engagement with Others' Ideas: A Summary. Evidence from these case studies and 12 discussions that had clear power and authority implications suggest that how students in Ms. Kanzer's classroom engaged with others' ideas was influenced by relative differences in power and authority among students. In other words, these findings show that when discussing content, student' interactions are shaped by more than the task and content at hand. Power and authority, these findings suggest, is likely to influence the ways students work with and listen to one another as they engage with one another's ideas.

CHAPTER VI

The Teacher's Role in Supporting Students' Engagement with Others' Ideas

Heretofore I have primarily focused the findings section of this dissertation on students, both portraying how students engaged with others' ideas and what students had the opportunity to learn by engaging with others' ideas. I now turn my attention to the classroom teacher's role in this work. In doing so, I address my third research question "How does one 5th grade teacher create classroom conditions that support student' engagement with others' ideas during math, literacy and social studies?"

I organize my results for this section into five central findings. These findings all emerged from the teaching and learning that occurred in Ms. Kanzer's 5th grade classroom. The data used to develop these findings was gleaned from grounded theory study of transcripts of discussions, teacher interviews, and field notes.

Finding #1: Ms. Kanzer Created an Environment Conducive to Making Sense of Academic Content

In the months I spent in Ms. Kanzer's classroom, I observed all manner of classroom activities. Ms. Kanzer's role in these classroom activities varied widely. During some class periods, Ms. Kanzer worked quietly with small groups of students as the rest of the class worked independently. During others, students engaged in lively whole class discussion for most of the time. I often asked myself "What is consistent in the teaching that is happening here?" After reviewing the available data from these class periods and interviews, the most consistent

through-line among these class periods was the way in which Ms. Kanzer created an environment where students *made sense* of academic content. In turn, this sense-making environment allowed students to regularly engage with others' ideas. In the paragraphs below, I identify three elements of Ms. Kanzer's teaching practice that contributed to this sense-making environment. First, I describe the way she appreciated students as diverse, capable individuals. Second, I discuss her open stance towards students' ideas about content. Finally, I depict her focus on guiding students towards important content understandings.

An appreciation of students as diverse, capable individuals. One of the most salient characteristics of Ms. Kanzer as a teacher was the ways in which she appreciated each student and could point to their individual strengths. This was no more apparent than in her interactions with and thoughts about Bobby. Bobby was a below grade-level reader who frequently called out and left for trips to the bathroom during whole class lessons. Ms. Kanzer identified him as "the most challenging" of the students that I regularly asked her about. At the same time, Ms. Kanzer thought and communicated about Bobby in a way that reflected her appreciation of him. In one interview, she described how Bobby's "reading has totally improved, he loves being a leader, and his class participation is great." On another occasion, she told me that even though he was a "pain" sometimes, she was "psyched about his progress in his book" and "impressed with his last couple homework assignments." Ms. Kanzer developed a nuanced understanding of Bobby, which likely helped create an environment where Bobby could attend to academic content while feeling valued and appreciated.

Ms. Kanzer's ability to see and value students in her classroom extended well beyond Bobby, whose challenging behaviors and high participation naturally garnered attention. Ms. Kanzer paid particular attention to the role of students who participated infrequently in whole

class discussions. She noted that it is easier to pay attention to students who are "jumping out of their skin to either participate or to move around," but that she really tried to "focus on the quiet ones and not ignore them because they weren't the loudest." One of the quieter students that Ms. Kanzer expressed a particularly appreciation for was Rebecca. Rebecca received small-group support from math specialists, read at a slow rate based on assessment data, and participated infrequently in whole-class discussions. In an interview, Rebecca identified herself as someone who "takes longer to think about things." She also noted that she liked to "think on [my] own first]" and "do things my own way." Yet Ms. Kanzer often pointed out the "brilliant observations" Rebecca made in an understated way. Rebecca recognized and appreciated Ms. Kanzer's regard for her ideas, and in a student interview she mentioned that because Ms. Kanzer liked her ideas, other students "really like how I notice things." Rebecca continued on to mention that "like people say I say interesting stuff, and Gio even started to call me The Chosen One," a comment that Rebecca shared with a smile and a chuckle. Though Ms. Kanzer's appreciation for Rebecca didn't necessarily cause Rebecca to be appreciated by her classmates, Rebecca's comments suggest that Ms. Kanzer's positive estimation of diverse students could have influenced how student in the classroom regarded one another. In this way, Ms. Kanzer's ability to recognize and appreciate the talents of a variety of students in her classroom helped create a sense-making environment where students could engage with others' ideas.

An open stance towards students' ideas about content. Throughout my time in the classroom, Ms. Kanzer cultivated a classroom environment where students' ideas about content mattered. One indication of this was the language Ms. Kanzer used when she responded to students' ideas. One of the most common ways that Ms. Kanzer responded to students' ideas was to say "Wow," or "So interesting" before further probing the student about the topic. For

example, during one whole class math discussion, Andrew described how he figured out that 1/3 and 2/6 were equivalent on the number line. On a bar model that looked like the model below, Andrew moved his pencil along the number line and told the class that he knew 1/3 and 2/6 were equivalent because his pencil ended up in the same place. “Wow, so interesting, I never thought of doing that” Ms. Kanzer responded. “Can everyone use their pencil to show whether 2/3 is equal to 4/6?” This response – in which Ms. Kanzer showed interest in a student’s idea before offering it to the rest of the class – was typical for Ms. Kanzer. Later in the class period, a student noticed that the fraction bars on the board looked like a mountain. Another chimed in that it looks more like a rocket ship. Rather than immediately dismissing this line of conversation, Ms. Kanzer expressed interest in the student’s idea and asked what they meant.

Ms. Kanzer also cultivated a classroom environment where diverse and divergent ideas were welcome. When students expressed similar ideas to one another, Ms. Kanzer specifically asked for ideas that were different than those previously expressed. During one whole class discussion in math, Haley demonstrated how she added 3 and 5/8 and 2 and ½ on the white board, describing how she made a common denominator of eighths before locating 3 and 5/8 and making jumps of 2 and 4/8 to figure out the sum. After this explanation, Ms. Kanzer could have moved on. Instead, she announced “Okay, that’s one way. But let’s approach the same question using a different tool. Who did not use a number line? Haley call on someone, and try to call on some new faces and voices okay?” This excerpt demonstrates how Ms. Kanzer both encouraged new and different strategies and also made a point to welcome a variety of voices into the conversation. Later in the conversation, Ms. Kanzer made her reasoning for introducing a variety of tools explicit to the class. “What’s easier for one student is not easier for another, Ms. Kanzer announced, “so that’s why I want you to have so many different strategies. This is because your

brains are different and also because you want to have different tools to pull." Ms. Kanzer was interested in bringing out ideas that were different than the conventional thinking of the class, and often succeeded at doing this. This openness towards student ideas contributed to the creation of a sense-making environment where students engaged in others' ideas.

A focus on improving students' content understandings. While Ms. Kanzer valued students' thinking, she also prioritized developing students' content understandings. Ms. Kanzer devoted multiple months of mathematics instruction to work on fractions, and spent significant time working with students to help them support their ideas with evidence in literacy. She made these curricular choices because she knew these topics were "really hard" for students. Ms. Kanzer had these desired understandings in mind during whole class and small group discussions. She frequently described a delicate balance between honoring students' thinking and guiding them towards these understandings. This thought process also emerged while Ms. Kanzer studied the thinking of other teachers. After reading the transcript of a teacher leading a social studies discussion comparing two maps of Michigan, Ms. Kanzer's summary comment about the discussion was as follows:

> So, that's kinda what I noticed [about the discussion]. There's moments of her listening to kids, and then trying to get them to get to big ideas, but she's definitely listening to them, but has an end goal in mind, I guess. They could go on and on with the conversation. You kinda have to know when to redirect the conversation to what's important, and when to let the kids go.

Ms. Kanzer's knowledge of desired understandings for 5th grade student gave her specific criteria that she used to push students' ideas and work. As previously noted, Ms. Kanzer placed a premium on students using evidence to support their ideas. She frequently asked other students

in the class if they thought a student's idea was supported by evidence. Furthermore, after overhearing Randy and Gio developing ideas about a text without referencing evidence during a small group conversation, Ms. Kanzer made them re-do their work and helped them to do so. When students met Ms. Kanzer's high expectations around evidence, she provided them with positive reinforcement. After Bobby read directly from *Bud, Not Buddy* in order to support his analysis of how and why the author repeats so many phrases, Ms. Kanzer responded favorably.

> You notice how Bobby always goes back to the text, and keeps going back to the text? I know you all are, but I just wanted to really emphasize that. That you're pulling your background knowledge in order to think about the book, but everything is really based on what the words the author is saying.

By highlighting the specific strengths of Bobby's work in the quote above, Ms. Kanzer made clear that using evidence to support ideas was essential to doing quality work.

Another way in which Ms. Kanzer provided clear criteria for students to strive towards was by presenting exemplar work. Ms. Kanzer often had students present their work in front of the class. For example, after students worked in small groups to answer the reading response question "Why did Bud's mom name him Bud?," Ms. Kanzer had Amariah put her work under the document camera. She framed the share by telling the class "Now, your answer doesn't have to look exactly like this, but let's look at how she's structured it. Does she have the important pieces she needs to answer this question? And if not, how can we help Amariah improve it?" This framing illustrates how Ms. Kanzer created clear standards for high-quality work in her classroom and positioned students' role as to reach her standards of high-quality work. In combination with her appreciation of students as individuals and openness towards student ideas, Ms. Kanzer's focus on supporting students' content understandings contributed to a classroom

environment conducive to making sense of academic content. With this sense-making environment established by Ms. Kanzer, students had ample opportunities to engage with others' ideas.

Finding #2: Ms. Kanzer Attended to How Students Related to One Another

As illustrated above, Ms. Kanzer played a central role in creating a sense-making environment that was conducive to engaging with others' ideas. Just as important as this sense-making stance, however, was how Ms. Kanzer paid attention to how students related to one another in her classroom. She tended to student relationships in a number of ways, which I explain below. Taken together, the way in which Ms. Kanzer attended to student relationships supported students' engagement with others' ideas.

Supporting relationships through community building. Ms. Kanzer's attention to student relationships permeated her classroom from the beginning of the day to its very end. Ms. Kanzer held a morning meeting each day when students greeted one another, shared news from their lives outside of school, and played a daily game together that was often a source of cheering or laughter. On Friday afternoons, students held an End-of-Week meeting where they shared highlights of the week and appreciations for their classmates. One End-of-Week meeting proceeded as follows:

> Ms. Kanzer rings a chime and tells students they will start End-of-Week meeting in a few minutes. Alonso and Hannah take out a game board stored behind the easel that students seemed to have designed. The game board is divided into three sections -- Events, Compliments, and Problems. Each student places their card on one of the three sections. Then Sorah convenes the meeting. The students go around and each share something. Calvin says he's excited to watch the Patriots. Tara shares a problem - asks if students

> will not be so crazy at library free time so they have some of it taken away. Randy also shares a problem – that he nudged a student at soccer at recess, and people pushed him on the snow for payback. He asks if people could help him out next time. Students continued to share, then students went around the circle and offered solutions and responses to one another [1-19-18].

This End-of-Week meeting exemplified the attention Ms. Kanzer paid to community-building and student relationships. By having students lead morning and end-of-week meetings and express their concerns to one another, Ms. Kanzer helped foster student relationships and a sense of community in her classroom.

Teaching students to listen. Ms. Kanzer supported students in engaging with others' ideas by teaching them to listen to one another. Early on Ms. Kanzer told me that "It's critical that students learn to listen to one another's idea and be open to it and let it challenge your own a little bit." Ms. Kanzer regularly put this value into action by emphasizing the importance of good listening before, during and after discussions. For example, before Ms. Kanzer sent students off to discuss a chapter of *Bud, Not Buddy* one day, she explained that in order to have a rich conversation, a good listener must speak up and ask for more information if they're confused.

> Okay, so if you're talking with someone. You have to be accountable and not just say "I don't know, I don't know." You have to be able to, maybe if you're confused, you want to have something clarified. If someone is talking to you and you don't know what they're talking about? … [then] it's not really a conversation. This is all about how to have you have a conversation. To help you have a conversation. So, if you need something clarified, you can ask a series of questions.

Ms. Kanzer anticipated that this would not come easily to students. Therefore, instead of simply sending kids into their partnerships, she provided sentence starters including “What do you mean when you said _____?” and “Can you give more evidence to support what you just said?” to help student interact while listening to another student speak. She explained this as follows:

> Now, sometimes when I say ‘I want you to talk to each other and ask questions,’ kids are like "I don't know what to say." So, this piece of paper, and that helps to answer this. Like you could say “I'm not sure I understood you when you said ... Blank. Could you say more about that?" Because some kids at this age are like, "I don't know what to say to the person if I'm confused" but you actually have a lot of options on this sheet. You could also make a statement like "I don't understand when you said blah blah blah."

While in small groups later in this class period, students interacted productively over content. Rebecca asked Calvin “What do you mean?” multiple times over the course of their small group talk. Dan and Tara had a lengthy discussion of the scene in Bud, Not Buddy, which included the two students offering a combined 12 comments where they responded to each other’s thinking, thereby engaging with each other’s ideas. During this classroom episode and others, Ms. Kanzer’s instruction around listening during subject matter work seemed to support students in relating to one another and engaging with others’ ideas.

Thoughtfully creating and supporting small groups. Ms. Kanzer thought carefully about how she grouped students, another important factor in helping students engage with others’ ideas. She explained that a baseline for good group work was for students to be invested in their work and respectful of one another. In an interview with Ms. Kanzer, she explained that she used three criteria for making partnerships and small groups. First, she considered students’ confidence in a given subject area. Second, she thought about students’ content understandings.

Third, she thought about student personalities. She then created small groups and partnerships that she thought might complement each other and allow them to engage in one another's ideas. Ms. Kanzer noted "I think I have gotten better at creating partnerships that would work productively together, or at least more intentional." Observations and interviews with students in the classroom supported Ms. Kanzer's confidence about her practice in this area. For example, Bobby noted that he works particularly well with Dan in math, and during many class periods, Dan and Bobby worked well together during math.

Ms. Kanzer also took proactive steps that would help student groups and partnerships work well together. On the first day of having kids work in new math partnerships, which she sustained for about a month, she had students interview each other to get to know each other as mathematicians. Students asked one another questions such as "What types of math problems do you feel most confident with?" and "What can I do to help you when you get stuck?" Ms. Kanzer noted that this exercise allowed students to know each other better as mathematicians, which contributed significantly to group work being productive.

Sometimes Ms. Kanzer created partnerships that did not lead to robust discussions. For discussions of *Bud, Not Buddy*, Ms. Kanzer partnered Bobby and Sorah. She mentioned that she thought that the two would complement one another since Bobby asked many questions about text and Sorah read avidly but often skipped ahead in books without engaging in higher-level thinking. Over the course of the month, however, Bobby and Sorah had frequent conflicts about who would read, what their assignment was, and more. Instead of splitting the group up, however, Ms. Kanzer stuck with the pairing and coached them on working together. At the end of one reading period, Bobby and Sorah approached Ms. Kanzer to tell her that they were both done sharing their sticky notes with one another. "Great," Ms. Kanzer responded. "What's one

thing new that you learned from one another that you didn't know before talking?" Bobby responded that he learned nothing. "Nothing," Ms. Kanzer responded with surprise, "The point of working with other people is to really learn some new things from each other." Pressed into stretching to find something, Bobby said that he had noticed that Sorah used some big words and that helps him with his vocabulary. Later in the conversation, Ms. Kanzer had Bobby and Sorah reflect on what was working well with their group and what they could improve on. In this manner, Ms. Kanzer supported students in working well together even if they didn't always do so naturally. In a brief interview later that day, Ms. Kanzer said "I think Bobby and Sorah will really learn a lot from each other even if it doesn't seem like that, and they're going to grow from having opportunity to work with someone who works different than themselves." Though dynamics between students were sometimes unpredictable, the care that Ms. Kanzer put into grouping student and supporting their group work helps students develop the ability to engage with others' ideas in multiple subjects.

Awareness of impediments to strong student relationships. Ms. Kanzer's attention to the obstacles that stood in the way of strong student relationships was one further factor that helped students engage with others' ideas. One impediment she recognized was that students had impressions of other student' abilities and work habits. She recalled how during a reading discussion earlier in the year, Maggie shared her idea about a character. When someone challenged that idea, Vince called out "Maggie reads 80 books a year!" implying that she was going to be correct because of the amount she read. Ms. Kanzer recalled challenging Vince's assumption that Maggie was correct, but she knew that these impressions would persist. She also noted that these impressions extended to the work habits of certain students. "People get on Bobby a little bit, and kind of do the work for him because they don't think he'll do it," Ms.

Kanzer observed. She recognized that he "could be a pain and people get frustrated by that," but also bemoaned that this affected how others listened to him. Ms. Kanzer's impressions were supported by classroom observations, as students sometimes ignored Bobby even when his ideas were pertinent to the discussion.

Ms. Kanzer also recognized that students who did not feel at ease during group work would struggle to engage with others' ideas. Carlos, a student who was new at the school this year, often participated in whole group discussions and did not appear nervous or influenced by his recent arrival at the school, and Ms. Kanzer described him as initially seeming "well-adjusted." Two months into the school year, however, Carlos approached Ms. Kanzer and told her that small group work was "hard for him" because he didn't always know the student he was working with. Ms. Kanzer accommodated Carlos by trying to create groups where he felt comfortable, and helping him find partners when students created their own groups. These interventions were possible only because Ms. Kanzer recognized Carlos's status as a potential impediment to his ability to engage with other's ideas, and have other students engage with his own.

Supporting student relationships through work on subject-matter content. With these community-building opportunities as the backdrop for the ways that students related to one another, Ms. Kanzer also tended to student relationships within class periods focused on academic content. Ms. Kanzer felt that fostering relationships between students was crucial work for helping student engage with others' ideas. When asked what makes discussions work well, Ms. Kanzer focused on student relationships.

> I think [discussion] works well when [students] are not only just talking about the content but they're also really respectful of each other, like who they are and what they need. I

> mean I feel like when kids are really listening to each other and when they care about each other it goes better. I feel like if they also know each other well as students and learners I feel it goes much better too. I try to work on this, like when I began a math lesson at the beginning of the year I had them list what they wanted their partners to know about them.

Here, Ms. Kanzer expresses a belief that how students related to one another was significant for their learning of content. Some students expressed similar beliefs to Ms. Kanzer when asked when discussions go better and worse. Bobby said he liked working with "people I kind of know" because they "get my ideas," and Calvin said he sometimes does better when working with "people I like and do things with besides school stuff." In essence, Ms. Kanzer prioritized student relationships during subject-matter area learning, which matched student priorities as well. Though Ms. Kanzer was serious about teaching subject-matter content, she consistently paid attention to students' relationships with one another. This attention to student relationships was a key factor in helping students engage with others' ideas.

Finding #3: The Teacher's Understanding of the Content she Taught Related to Students' Opportunities to Engage with Others' Ideas in Some Subject Areas

Ms. Kanzer also supported students' engagement with others' ideas through her understanding of the content she taught. In particular, Ms. Kanzer's understanding of math and literacy appeared to be related to the differing opportunities students had to engage with others' ideas in each of these content areas. Therefore, I present findings about these two subject areas in the pages that follow.

Conception of mathematics as a subject matter. Ms. Kanzer's pedagogy and thinking about mathematics showed that she understood communication to be integral to learning in the

subject area. When asked what was important for students' math learning, Ms. Kanzer replied without hesitation that it was "communicating their understanding and being able to explain *why* they're doing what they're doing." She continued to note that this communication takes on many forms; explaining one's thinking in writing and words, using visuals to support an explanation, and listening to others' ideas. Ms. Kanzer's pedagogy supported these beliefs. Ms. Kanzer repeatedly provided feedback on students' explanations, and put particular emphasis on how students used visuals to support their explanations. Her feedback to students as they presented explanations included "Can you point to exactly where on your number line you're referring to?" and "Raise your hand if it would be helpful if Vince showed another example of what he was talking about." Ms. Kanzer thought communicating one's thinking on paper was just as important as being able to explain it verbally. Her goal for students, she said, was for them to be able to "show someone their paper and have them be able to track the thinking from the words and pictures on the page." Naturally, these beliefs about the discipline of mathematics and how it was best taught guided Ms. Kanzer's teaching of mathematics, leading to numerous opportunities for students to engage with others' ideas.

Ms. Kanzer also identified a number of mathematical concepts that she saw as crucial to her 5th graders' development, topics around which students frequently engaged with others' ideas. After having taught 5th grade for a number of years, she knew that she would devote substantial curricular time to fractions as it was a topic where students commonly held misunderstandings. Ms. Kanzer also noted that she saw an understanding of the place value system as essential to 5th grade, which was the primary focus of her teaching in the first two months of school. Finally, she pointed to patterns of how operations work as being crucial to 5th graders' learning. "We're multiplying with fractions and decimals, so students need to be able to both calculate and also

notice patterns that happen within operations," Ms. Kanzer said. She stressed that students could then "use those patterns to talk about the operations in more general terms, rather than just having a rote memorization of rules." Along with the importance of communication in mathematics, Ms. Kanzer's focus on a few mathematical topics seemed to dictate the opportunities students had to engage with one another's ideas.

Professional development in mathematics. Ms. Kanzer pointed to both experience teaching mathematical content and professional development as key sources that informed her understanding of mathematics and the topics she taught within the discipline. "All the years of teaching matter 'cause I know what's important, and that I've taught grades three through five," she replied when asked how she came to see the aforementioned topics as crucial for fifth graders. Ms. Kanzer largely attributed her emphasis on communication to professional development. For the past three summers, she had attended workshops held by authors of the TERC Investigations Curriculum, which she said informed her belief that communication was a crucial part of teaching and learning mathematics. Ms. Kanzer had also seen Jo Boaler speak in person in Massachusetts earlier in the year, and noted that her Youcubed "Week of Inspirational Math" resources and book *Mathematical Mindsets* informed her views of what mathematics was and made her more likely to stage whole class and small group discussions.

Conception of literacy as a subject matter: A contrast. As compared to mathematics, Ms. Kanzer less clearly highlighted the importance of communication and engaging with others' ideas in literacy. This was partly because Ms. Kanzer had a broader, less specific set of priorities for student learning in reading and writing. When asked about what content was important for 5th graders to learn in reading, Ms. Kanzer said the following:

> There's so many parts of reading…I mean, I feel like it's so much. It's text structure, what's the big idea, vocabulary, enjoying reading, fluency. I mean I feel like kids this age- It kills me when they really hate reading. I wasn't in love with reading in 5th grade, but I didn't hate it. So, I think that's a big piece, too, but there's so many pieces. Also, I think going from the inferential thinking is huge…more showing them deliberately what it is to think about reading that's not directly on the page-I think it's a really big deal too. But then there's vocabulary, and point of view. It's all that stuff.

This quote exemplifies the many and varied priorities Ms. Kanzer had related to reading. This may have influenced Ms. Kanzer's varied instruction, as students engaged in a variety of activities in reading, from partner reading to listening to audio books to answering reading response questions. It also presents a contrast to mathematics, where Ms. Kanzer clearly stated that mathematics was a subject where communication was essential.

While Ms. Kanzer's understanding of mathematics as a content area clearly influenced students' opportunities to engage with others' ideas in math, Ms. Kanzer's understanding of literacy as a subject matter may have had less impact on students' engagement with others' ideas in this subject area. Ms. Kanzer commonly noted that she knew less about reading and writing than she did about mathematics, and said she had not attended summer professional development on reading and writing in recent years. She also said she spent more time preparing for mathematics teaching and learning because she was the team leader in this area, and mentioned that she was interested in becoming a mathematics coach in the district in the following year. In summary, Ms. Kanzer's understanding of literacy as a subject matter did not seem to support student' engagement with others' ideas in the same ways at it did in mathematics.

Finding #4: The Teacher Made Specific Moves that Helped Students Engage with Others' Ideas

Ms. Kanzer used a variety of teaching moves that supported students' engagement with others' ideas. Some of these moves helped create conditions for engagement with others' ideas, while other moves directly led to moments where students engaged with others' ideas. Table 11 presents the frequency with which these moves occurred, grouped into these two categories, and following the table I describe and present examples of the moves that Ms. Kanzer engaged in.

Table 12. Teacher moves related to engaging with others' ideas, by category

Moves by category	Count
Creating Conditions for Engagement in Others' Ideas	29
Prompting and coaching work displays	26
Elicits more from student speaker	21
Seeking out diverse ideas	18
Insisting on connection to others' ideas	
Prompting Engagement with Others' Ideas	15
Prompting check for understanding	10
Prompting agree/disagree	15
Prompting student questions	7
Prompting different ideas	

Note: These figures only include teacher contributions from whole-class discussions

Prompting and coaching work displays. One of the most frequent moves that Ms. Kanzer made to create conditions for engagement with others' ideas was to ask students to display their work at the board and coach them on how they did so. After students worked on math problems in partners or pairs, Ms. Kanzer often asked students to come up to the board to display their work. For example, after students worked in pairs on the Sharing Several Brownies problem, Ms. Kanzer initiated a whole group share by asking students to come display their work, as in the following transcript excerpt.

> Ms. Kanzer: Let's start with our share with someone putting their work on the board. Again, it doesn't have to be perfect, and you might still have a question, which is completely fine…I may not get to everybody, but I'm going to have at least a few people pop up and share. [Takes out a bin of popsicle sticks and chooses a name]. Bobby, your name came up. Can you come up and put your work under the document camera?

Bobby proceeded to walk up to the board, display his work, and explain it. Yet this was not the only time in the discussion that Ms. Kanzer prompted students to display their work visually. After Alonso commented that Bobby's work could be improved by using a key, Ms. Kanzer interjected by asking Alonso to show the class what he meant:

> Alonso, could you actually go up to the white board and show what you're talking about? That way more people will be able to understand it and see it.

Finally, when Ms. Kanzer wanted to bring in other ideas into the discussion, she framed this request around presenting new work on the board:

> Who has a picture on their paper that they would like to share up on the board that might introduce a different idea or concept, some work that if we looked at it we'd see something different.

In this way, Ms. Kanzer repeatedly prompted students to not only describe their work to one another but to visually display their work to one another at the white board.

When students arrived at the board, Ms. Kanzer often coached students on how they used the document camera. She did so by checking in with other members of the class to see if they could see the presenter's work before the explanation began. For example, when Amariah placed her response to a short answer question about *Bud, Not Buddy* under the document camera, Ms. Kanzer coached her to show and present her work in ways that were clear to all.

Ms. Kanzer: Amariah can you place it more in the middle so we can all see? Okay great. Now can you zoom in a little bit so that we can see the text well? And as you're explaining, you might want to use your pencil to show the parts of your answer you're talking about.

These comments exemplify Ms. Kanzer's attention to not only displaying work but doing so in ways that were comprehensible to all. In a similar vein, Ms. Kanzer even coached students on where they stood as they presented. As Amariah was answering questions while still up at the board for the same presentation she coached Amariah as follows: "Amariah can you do that teacher thing where you stand to the side and don't block your work?" Through prompting students to display their work and coaching them in how to do so, Ms. Kanzer made sure student' work was visible to all. This small practice may have set the stage for students to be able to engage with others' ideas.

Eliciting more from the student speaker. Ms. Kanzer also created conditions for students to engage with others' ideas by eliciting the thinking of student speakers. She frequently probed student thinking in ways that gave other student more insight into their thinking. For example, Dan raised his hand during a discussion of the fourth chapter of *Bud, Not Buddy* and the following sequence of talk ensued:

Dan: It's kinda hard to read but I made a prediction

Teacher: Yeah? What is your prediction?

Dan: And I predict that Bud is gonna run away from his new home.

Teacher: Can you say what that...why what thought...like what did you read that made you think this?

Dan: Well in the beginning you said that he was by himself, and he's going to a family, so I think he's gonna run away from his family. Cause he doesn't like it cause in the beginning he said he's gonna have a lot of problems with his older brother person. And...

Bobby (calling out): Yeah oh I agree!

Teacher: Can someone respond to Dan?

In this sequence, Ms. Kanzer asks Dan to both share his prediction and justify his prediction. Then, when this information is revealed, she prompts other students to respond to his idea. By the time Ms. Kanzer asked student to respond to Dan, a number of students' hands were raised, and as noted in the transcript, at least one student called out a response to Dan. Ms. Kanzer's tendency to elicit more thinking from students provided more ideas that other students could engage with.

Seeking out diverse ideas. Ms. Kanzer also made a habit of seeking out ideas that were different than ideas previously presented. This was especially the case after two or three students provided comments that were somewhat similar. For example, in the Sharing Brownies problem that resulted in sustained periods of student' engagement in others' ideas, Ms. Kanzer asked "Who has a picture on their paper that they would like to share that would be a different idea or concept of this, and that if we looked at it, we'd see and learn something different?" At this point, Tara raised her hand and presented her strategy of dividing the two leftover brownies into 100/100s each, an idea that sparked discussion and debate. At times, Ms. Kanzer made clear that she only was interested in ideas that were different from those previously presented. During a whole-class discussion of a scene in *Bud, Not Buddy,* Ms. Kanzer saw many students' hands raised and said,

Okay. So, your hand's up if you have something different to share, right? That's a lot of hands, right? So, we have to decide when we're going to move on, and if you're contributing something different or building off of an idea. Are your hands up because you have something totally different to share?

Ms. Kanzer not only asked for ideas that were different than those previously presented, but intentionally sought them out. This provided more opportunities for students with divergent thinking to share their work, which then sparked student engagement in their thinking.

Insisting on connection to others' ideas. Though Ms. Kanzer sought out ideas that were different from those previously presented, she was insistent that students present ideas that were connected to previous student' thinking. She commonly called on students to share their thinking, and either interrupted them before or during their turn to ask if their idea connected to one previously shared. One such sequence went as follows.

Steven:That's a thing of trust. Bud's met a lot of adults, and they weren't all nice to him, right? right? So, he might not feel good about adults. Bobby?

Bobby:Well, I have something to add on, and I also want to share one of my sticky notes.

Ms. Kanzer: Well we're sticking with this, right?

Bobby:Uh, okay.

Ms. Kanzer: You have to respond to this before you go to a new topic.

When Ms. Kanzer insisted that students connect their ideas to those of the previous student, students almost always responded to others' ideas in the proceeding comment. Ms. Kanzer implicitly placed value on individual student contributions. During one discussion, Carlos explained how he would estimate the answer to 5 x 7/8, and asked for questions. Maggie raised her hand, was called on by Carlos, and said. "I have another way of showing it," Ms. Kanzer

tersely interrupted her by saying "We're thinking about Carlos' work now" before moving on to another student. Ms. Kanzer showed significant dedication to sustaining talk on a single idea, and supported student' engagement in others' ideas by doing so.

Prompting checks for understanding. The simplest and most common way that Ms. Kanzer prompted student to engage with others' ideas was by asking students who were presenting their ideas to check to see if other students understood what they were saying. Ms. Kanzer often did this by saying "Check in with your audience" when a student had paused during an explanation of their work. For instance, Amariah explained that in order to compare 5/6 with 7/8, she found a common denominator and created equivalent fractions (20/24) and (21/24) for each of the two fractions. Ms. Kanzer, perhaps sensing that not everyone understood Amariah's approach, prompted Amariah to check to see if her audience understood what she was saying. Amariah immediately did so as you can see in this transcript excerpt:

> Ms. Kanzer: Can you check in with your audience? You could say something like 'Do you understand what I'm saying'
>
> Amariah: Do you understand what I'm saying?

In this example, Ms. Kanzer not only prompted Amariah to check to see whether student understood but also provided Amariah with sample language for doing so, which Amariah used. Two students then engaged with Amariah's ideas by asking her questions about creating common denominators. This was typical; students often used the language offered to them by Ms. Kanzer for checking other student' understanding, and then student-to-student talk immediately followed Ms. Kanzer's interventions. In a discussion where students offered their estimates of 20 x 3/5, Ms. Kanzer provided Gio with language to ask other students for questions when she said, "Hang on, you should stop and turn and face your audience and say "Do you have

any questions about that?" Rose did exactly as Ms. Kanzer asked, prompting Hannah to say that she was confused about Gio's estimate. Ms. Kanzer's direct prompts to students to check for their peers' understanding frequently led to student engaging with others' ideas.

Prompting agreement or disagreement. Ms. Kanzer also prompted engagement with others' ideas by asking students if they agreed or disagreed with one another. Ms. Kanzer most often did this just after a student shared their opinion. During one whole class discussion of *Bud, Not Buddy*, Ms. Kanzer asked students to try to unpack the meaning of the "rules" that Bud had developed for living life as an orphan, Ms. Kanzer asked Tim to read one of the rules and summarize what it meant. Tim summarized the rule as follows: "I think that rule says that adults are tricky, and you have to let them think they can trick you even if they can't." Rather than responding to Tim's idea herself, Ms. Kanzer asked student to respond to Tim's idea, which incited multiple turns of student-to-student talk.

Ms. Kanzer: Do you all agree with Tim?

Abigail: So, you mean that Bud's saying that you can't trust adults?

Tim: Yeah

Abigail: Okay I agree then

Sorah: I don't really agree though, because I think Bud is just saying you should be careful around some adults, not all of them.

Ms. Kanzer: Tim do you agree or disagree with what Sorah just said?

In this sequence, Ms. Kanzer's question about whether students disagreed or agreed with Tim's idea set off multiple responses to Tim, all of which constitute forms of student engaging with others' ideas. Ms. Kanzer then invites even further student-to-student talk by asking students whether they agreed with Sorah, one of the students who responded to Tim. Through asking

students whether they agreed or disagreed with others' ideas, Ms. Kanzer directly prompted engaging with others' ideas.

Prompting student questions. Ms. Kanzer prompted students to ask questions of one another in clear and direct ways. For example, during one class Ms. Kanzer conducted a mental math exercise where she first wrote 36 x 1/5 on the board, then asked students to raise their hands and offer ideas of what would *not* be a practical answer to the question. Rose raised her hand and contributed first: "I know it couldn't be 45 because that would just be too big of a number. Like 1/5 is closer to 0 than to one whole, so I know that 36 is going to get smaller when you multiply it by 1/5." Ms. Kanzer then responded by restating Rose's thinking and asking student if they had questions for Rose:

> I see, so you're saying if it was 36 times something greater than 1 the answer could be 45, but since it's 1/5 it's got to be less than 45. Do you all have questions for Rose about what she just shared?

By asking students if they had questions for Rose, Ms. Kanzer directly prompted students to engage with others' ideas. In response to Ms. Kanzer's question, Bobby then raised his hand and asked Rose if she thought the answer definitely had to be less than 36. This question from Bobby to Rose, an example of a student responding to another student' idea, was directly prompted by Ms. Kanzer asking students to ask questions of one another.

Prompting different ideas. The final way in which Ms. Kanzer regularly prompted engagement with others' ideas was to ask students for ideas that were different than those recently shared. In a discussion about how to subtract 2 ½ from 3 and five eighths, Iris presented how she solved the problem on a number line. When she finished, Ms. Kanzer asked for a different idea: "Okay so let's stay on the same problem but get a different strategy. Who solved

this without using a number line? Can you compare your work to Iris' work?" In this comment, Ms. Kanzer elicited a new strategy in a way that prompted the next student to contrast their strategy with the previous student. Haley, the student who shared after Iris, began her comment by referencing Iris' work, commenting that "My strategy is a little different than Haley's strategy because I worked with all the whole numbers first, then I did the fractions." Haley's reference to Iris' work may have been prompted by the way Ms. Kanzer sought out a contrasting idea.

On occasion, Ms. Kanzer not only prompted a different idea but also dissuaded students from offering any ideas that were not different from the previous idea. During a discussion of *Bud, Not Buddy*, Ms. Kanzer asked the following:

> Okay. So, your hand's up if you have something different to share, right? Let's only have something that's different than the previous idea, and go ahead and explain why your idea is different.

At this point, Alonso proceeded to explain that his idea was different than Hannah's because he did not think that Bud needed to run away from each of his homes for his safety like Hannah did. Alonso's reference to Hannah's idea, which immediately followed Ms. Kanzer's request for a different idea, may have been a result of Ms. Kanzer's direct prompt.

Moves that helped students engage with others' ideas: a summary. Ms. Kanzer frequently employed specific moves that led to students engaging with others' ideas. Some of these moves helped create conditions where students could engage with others' ideas, whereas other moves directly led to students engaging with others' ideas. In both cases, the discussion moves that Ms. Kanzer employed were critical to her support of student-to-student talk within her classroom. In addition to the beliefs Ms. Kanzer held about her students, her work to help them relate to one another, and her understanding and beliefs about the subject matter she taught,

Ms. Kanzer's participation in the discussions was often followed by an increase in student-to-student talk and engagement with others' ideas. Therefore, the discussion moves that Ms. Kanzer employed helped catalyze students' engagement with others' ideas.

CHAPTER VII

Discussion

In the prior section, I described the findings of my research on the ways that students engaged with others' ideas in a classroom where the teacher supported this work. In this chapter, I put these findings in conversation with the scholarly literature on classroom discussion and engaging with others' ideas. I organize this section by separating findings and literature related to students from findings and literature related to teaching

Students' Engagement with Others' Ideas

Scholarly literature on classroom discussion often paints a grim picture of the quality and extent of classroom discussion found in U.S. schools (Reisman, 2015; Nystrand & Gamoran, 1997). In this study, I have found that in one 5th grade classroom, discussions occurred frequently. Even more promisingly, students regularly engaged with each other's ideas, a sub-practice of discussion that I have defined as classroom talk in which students respond or refer to one another. My study extends the literature on how students engage with others' ideas by suggesting that students engage with others' ideas in many ways, and may do so differently in various subject matters. I also extend the research literature by finding that students' socially constructed authority influences instances of student engagement with others' ideas in ways not previously identified by research literature on engaging with others' ideas. Finally, my study broadens the scholarly conversation on potential benefits of engaging with others' ideas by

finding that students in the classroom of interest had opportunities to learn about disciplinary practices and the nature of the disciplines.

Students engaged with others' ideas in a variety of ways. Extant research on engaging with others' ideas emerged from mathematics education literature. This research demonstrated the benefits of engaging with others' ideas in a few specific ways. Working in 3rd and 4th grade classrooms, Franke and colleagues found that students engaged with others' ideas in more and less sophisticated ways (Franke et al., 2015). They hypothesized that high-level engagement occurred when students added further detail to a students' idea, offered an alternative, or co-constructed a solution with another student, and that students who engaged with others' ideas in high-level ways showed high levels of student achievement (Webb et al., 2014). Though studies in literacy have examined discussions in which students responded to one another's ideas (Aukerman, 2007; 2016), research in this area had not yet specified how students engage with others' ideas.

My study broadens the research literature on how students engage with others' ideas. I divided the ways in which students engaged with others' ideas into two broad categories: responses and references to others' ideas. I found that in both literacy and mathematics and in both large and small groups, students responded to others' ideas by asking questions of one another, answering questions posed by students, agreeing and disagreeing, critiquing and making suggestions, and adding on to one another's ideas. I also found that students referenced one another by explaining others' ideas, connecting and contrasting to others' ideas, and occasionally referring to students' ideas from previous days' discussions. References to others' ideas occurred less frequently than responses, and more often in whole groups.

There are a number of reasons why students might have engaged with others' ideas in a wider variety of ways than previous research has shown. First, this study is the first to look at how students engaged with others' ideas in multiple subject areas. Looking across multiple subject areas allowed me to identify forms of engaging with others' ideas that may not have been present in studies of mathematics alone. Alternatively, this multidisciplinary lens may have simply lent itself to identifying ways of engaging with others' ideas at a different grain size than those previously identified in mathematics. That said, the finding that students in this study most often engaged with others' ideas by trying to understand others' ideas matches the view of literacy theorists that discussions of content must involve significant "comprehension-as-sensemaking" (Aukerman, 2013; Bakhtin, 1981). Therefore, it appears as if examining engagement with others' ideas in multiple subject areas may lead researchers to a different set of conclusions about the variety ways in which engaging with others' ideas occurs in classrooms.

My research may also complement existing ideas of how students engage with others' ideas because of the duration of time I spent in one classroom. Franke and colleagues generated their ideas about engaging with others' ideas based on one day of mathematics instruction in six 3rd and 4th grade classes. Logically, this may generate a different set of conclusions than my study, which was based on six weeks of observation in a single classroom.

Engaging with others' ideas gave students opportunities to learn about subject-matter content. Prior to this study, research had linked both classroom discussion and engaging with others' ideas to student learning. Scholarly literature demonstrates that given the right conditions, teaching and learning where discussion is present is associated with higher student achievement on standardized test scores (e.g., Chapin & O'Connor, 2007). Franke and colleagues also measured student learning, finding that when students engaged with others' ideas

at high levels, they were likely to show higher levels of performance on researcher-designed assessment of students' mathematical thinking, even after controlling for students' performance on pre-assessments (Webb et al., 2014).

The scope of this study did not allow me to study the relationships between how students engaged with others' ideas and the extent of their learning. In place of this, I studied the ways that engaging with others' ideas provided opportunities to learn content. I found that students had opportunities to learn not only about topics in literacy and mathematics, but also about disciplinary practices and the nature of the disciplines they studied. For instance, students received extensive feedback and coaching on their ability to "Construct viable arguments and critique the reasoning of others" as specified in one of the Standards for Mathematical Practice outlined in the Common Core (CCSS.Math.SMP.3). They also had the opportunity to learn that math is a discipline where communication is crucial, a message that reform-oriented math scholars frequently want to impart (Boaler, 2016). In literacy, students had the opportunity to learn to quote accurately, a 5th grade standard in the Common Core (CCSS.ELA.RL.5.1), and that interrogating text is central to literacy as a discipline.

The varied outcomes that students had the opportunity to learn extends research literature in important ways. Results from this study suggest that the manner in which students learn can provide opportunities to learn new aspects of subject-matter content. Students who largely work on math and literacy through seatwork and without talking to peers may have had the opportunity to learn about the same topics as the students in Ms. Kanzer's class, but would not have had the opportunity to learn the disciplinary practices and ideas about the disciplines themselves that students may have learned about in Ms. Kanzer's classroom. To the extent that disciplinary practices and understandings are priorities in schools as they are in research, this

study extends the research literature by suggesting that instruction where students engage with other ideas may provide opportunities to learn many forms of subject matter content.

Despite some similarities, students engaged with others' ideas in ways that differed by subject matter. Limited research examines classroom interactions in multiple subject areas (Spillane, 2000). Instead, researchers primarily study elementary school teaching and learning one subject-matter at a time. This is also true for research on how students engage with others' ideas within classroom discussions. Franke, Ing and Webb (2014, 2015, 2016) focused on mathematics discussions in their studies of how students engaged with others' ideas, while studies of classroom discussions in literacy involving phenomena similar to engaging with others' ideas likewise focused on a single subject-matter. One aim of my study was to extend this literature to discover whether students engaged with others' ideas similarly or differently by subject matter.

On the broadest level, students both responded to and referenced one another's ideas in all subjects. In particular, students frequently agreed, disagreed and tried to understand others' ideas in these subject areas. Students also tended to engage with others' ideas more readily when they had prepared their own thinking before sharing their thinking with others. In other words, on the surface, significant similarities existed in how students engaged with others' ideas in literacy and mathematics. After undertaking another round of data analysis, however, I found significant differences between how students engaged with others' ideas in mathematics and literacy. First, students engaged with others' ideas differently in mathematics and literacy because of the different purposes of discussion in these subject areas. In mathematics, students often engaged with others' ideas about how they solved problems, while in literacy students engaged with others' ideas in order to respond to questions focused on interpreting text. Second,

students engaged with single ideas for greater periods of time in mathematics than in literacy. While discussions in math more often focused on examining a single students' work with many students responding to a students' idea, discussions in literacy were more likely to involve answering the many interpretive questions that students posed over the course of the discussion. Third, students focused on communication when engaging with others' ideas in math much more often than in literacy. This may have been due to Ms. Kanzer's emphasis on visual representation and communication in mathematics. Finally, students engaged with others' ideas in different ways in literacy and mathematics. Students were more critical of one another's ideas in mathematics, more frequently offering critiques and suggestions than they did in literacy. In literacy, students were more likely to add on to others' ideas rather than disagree with or critique them. Students also offered ideas more speculatively in literacy than they did in mathematics, couching claims and questions with language such as "I wonder" and "I bet" rather than answering with certainty.

Analysis of differences between literacy and mathematics. One explanation of the differences in how students engaged with others' ideas is that the preparatory tasks that took place before the discussions were different across subject areas. In math, students had often worked to solve a series of word problems either on their own or with one or two peers before a discussion began. As a result, each student entered the whole class or small group discussion with both a strategy for solving the problem and a solution in mind. These preparatory tasks may have shaped discussions in mathematics because students often disagreed or agreed with students based on how closely other students' strategies and solutions matched their own, contributing to students engaging with others' ideas by critiquing or disagreeing with others' ideas. On the other hand, students most often prepared for discussions in literacy by generating questions while

reading. This may have naturally led to discussions where students asked questions about the text and posed different interpretations but were more likely to build upon others' ideas than to disagree or critique one another as they did in mathematics. It is likely that preparatory tasks may have played some role in the differences between how students engaged with others' ideas in mathematics and literacy.

Another explanation for the differences between engaging with others' ideas in literacy and mathematics is that students were engaged in substantially different discussion activities in these subjects. In math, discussions mostly involved examining other students' work. In these discussions, students' task was to critically examine others students' work and comment on it. This may have been a contributing factor towards students critiquing one another's ideas more often in mathematics than in literacy. In reading discussions, on the other hand, students posed questions that other students answered, and then peers elaborated on these ideas. This may have contributed to students engaging with others' ideas by responding to others' questions and adding on to one another's ideas more often in literacy. Furthermore, in students' work on listening, students were generally given creative and unstructured work when working together in listening, without clear outcomes or definitions of quality. Therefore, a second interpretation of the differences between engaging with others' ideas between subject matters is that the discussions that students participated in within each subject area naturally precipitated different forms of engaging with others' ideas.

A third interpretation of the findings presented above is that differences in how students engaged with others' ideas related to the disciplinary differences between the content areas being discussed. Mathematicians and mathematics standards documents have often argued that mathematics is a discipline of communication and argumentation (CCSO, 2010; Lakatos, 1976;

Rav, 1999), but students commonly see mathematics as existing in right and wrong answers. Though students communicated about mathematics in Ms. Kanzer's classroom, they were more likely to critique others' work in mathematics than in literacy, which suggests that students may think more in terms of right and wrong during mathematics discussions than in literacy discussions. Likewise, literary scholars argue that their disciplinary area hinges on interpretation, and welcomes multiple and competing interpretations of texts (Bakhtin, 1981). These norms may contribute to the softening of claims in literacy, and students being somewhat less likely to critique ideas and more likely to add on to one another. In other words, differences in disciplinary traditions may contribute to students engaging with students' ideas differently in literacy, mathematics, and other subject areas.

Socially-constructed authority may influence how students engage with others' ideas. Scholarly literature holds ample evidence that status and authority may influence cooperative group work in the classroom. Much of this research stems from the mid-90s work of Cohen and Lotan, which established that differential social status influenced classroom discussions, and that teachers could play a role in equalizing status in the classroom (Cohen, 1994; Cohen & Lotan, 1995; Featherstone, 2011). More recently, scholarly literature has focused on the authority that some students have over others during partner and small group work, and the way that this authority can lead to students disregarding or invalidating the mathematical contributions of their peers (Langer-Osuna, 2016). Though initial research on engaging with others' ideas did not consider the influences of these problematic group dynamics, the work of Johnson (2017) begins to show that engaging with others' ideas is influenced by students' socially constructed authority in the classroom.

The results of my study add further evidence to suggest that socially-constructed authority influences how students engage with others' ideas. In discussions such as Tara's whole-class share and Dan and Kanzer's small group work, students sometimes seemed to discount others' ideas off-hand. Taken together, the cases I examined reveal that students made quick decisions about the quality of their peers' ideas, that students' identities may have played a role in how students engaged with others' ideas, and that the classroom teacher influenced the ways in which authority shaped how students engaged with others' ideas.

The cases presented in this study are by no means an exhaustive list of how authority shaped discussions within the time I was in Ms. Kanzer's classroom. Yet even these few cases contribute to the argument, alongside Johnson (2017), that competence, status, and authority play a role in how students engage with others' ideas.

Teacher Support of Student Engagement with Others' Ideas

Teachers can facilitate discussion in ways that enhance students' engagement with others' ideas. This study builds off a considerable body of scholarship that shows that teachers can effectively support student understandings through discussions of subject matter content. In literacy, studies have found that interactive read alouds (Beck & McKeown, 2007; Baker et al., 2013) and reciprocal teaching (Palincsar & Brown, 1984) are discussion-based approaches that have positive learning outcomes for students. In mathematics, research suggests that students benefit from teachers who cultivate classroom environments where student autonomy and argumentation is prized (Ball, 1993; Yackel & Cobb, 1996). Researchers have also found that teachers also have the ability to create sociomathematical norms that help students think conceptually about mathematics (Kazemi & Stipek, 2001).

My research in Ms. Kanzer's classroom coheres with and extends this research. Through observations and recordings in Ms. Kanzer's classroom, I found that Ms. Kanzer effectively created classroom conditions that allowed for students to engage with others' ideas. She did so by creating a sense-making environment where students' ideas were valued, and by attending to how students related to one another through discussion. She also understood the subject matters she taught to be places where communication was important, and made decisions about curriculum that created opportunities for discussion.

These findings hold significant overlap with research on creating conditions for discussion, but extend and challenge the research literature in important ways. Ms. Kanzer's practices showed that she appreciated her students as diverse, capable individuals. In our desire to capture the specific elements of discussion that are important, the way that teachers think about and relate to their students can fail to be captured. Ms. Kanzer also had an open stance towards student's ideas, a stance that may be a baseline for discussions (Reisman et al., 2017). Attention to how students relate to each other, such as teaching students to listen and thoughtfully creating small groups, may also be keys to facilitating discussion that Ms. Kanzer highlighted with her practice but that receive less attention in the scholarly literature. Finally, Ms. Kanzer's content understandings and curricular decision-making must be part of any attempts to understand her practice and how she created conditions for discussion. Ms. Kanzer's beliefs that mathematics is a discipline of communication may have been the cornerstone value that allowed students to frequently participate in discussion. As a poignant contrast, Ms. Kanzer's understanding of reading and writing as subject matters was less precise and not as closely tied to communication, which may have led to the smaller number of discussions in those subject areas. Regardless, Ms. Kanzer's practices show that broad-level dispositions, mindsets,

and understandings may be crucial to teachers' ability to support students in engaging with others' ideas.

An array of specific discussion moves can help students engage with others' ideas. Another intention of this study was to examine what specific discussion moves might support students in engaging with others' ideas. Franke and colleagues (2015) organized the teacher's discussion moves that supported students' engagement with others' ideas into "invitation" moves that elicited students' thinking and "follow-up" moves that further probed students thinking. My research builds on Franke's work by identifying moves that Ms. Kanzer used to create conditions for students' engagement with others' ideas, and other moves that specifically prompted students to engage with others' ideas. Some of the moves that Ms. Kanzer made to orchestrate discussions did not directly support students in engaging with others' ideas, but created the conditions for them to do so. For example, Ms. Kanzer frequently asked that students display and explain their work. This allowed students the opportunity to see and study other students' thinking, a necessity for supporting students in engaging with others' ideas. Ms. Kanzer also made a point to seek out diverse ideas that differed from the ones already shared. This also created the conditions for productive conflict and debate. That said, Ms. Kanzer also made a number of moves that directly led to students engaging with one another. Perhaps the most salient of these was when she told students who were presenting their ideas to "check in with your audience" or "Ask everyone if they understand." After the presenter complied and asked others what they thought of their work, students would engage with others' ideas, sometimes for extended periods of time. Ms. Kanzer also prompted student questions, suggestions from peers, and responses. In this way, Ms. Kanzer used an array of moves that catalyzed students' engagement with others' ideas. Ms. Kanzer's

varied use of discussion moves matches research on discussion that notes that the use of distinct moves can impact the success of discussions (Beck & McKeown, 2010)

Though Franke's work and my research categorize teacher moves to support engagement with others' ideas in different ways, I do not see our conceptions of how teachers can support students' engagement with others' ideas as conflicting. Instead, I see our work as complementary. While Franke and colleagues (2015) categorized student contributions as high, medium, and low-level instances of engaging with others' ideas in order to connect levels of student participation with student learning, my research focuses on precisely how students engage with others ideas. In doing so, my research adds another layer to the work undertaken by Franke and colleagues. Furthermore, my work extends Franke's by focusing not only on teacher moves but also on how the teacher created the conditions for engagement with others' ideas. I argue that the conditions for engagement with others' ideas created by Ms. Kanzer were essential to creating a classroom environment where students engaged with others' ideas across the school day.

CHAPTER VIII

Implications and Conclusions

In this final section, I present implications and conclusions of this study. I separate these implications into implications for educational practice and implications for research and researchers. I also discuss possible implications for how researchers conceptualize engaging with others' ideas.

Implications for Practice

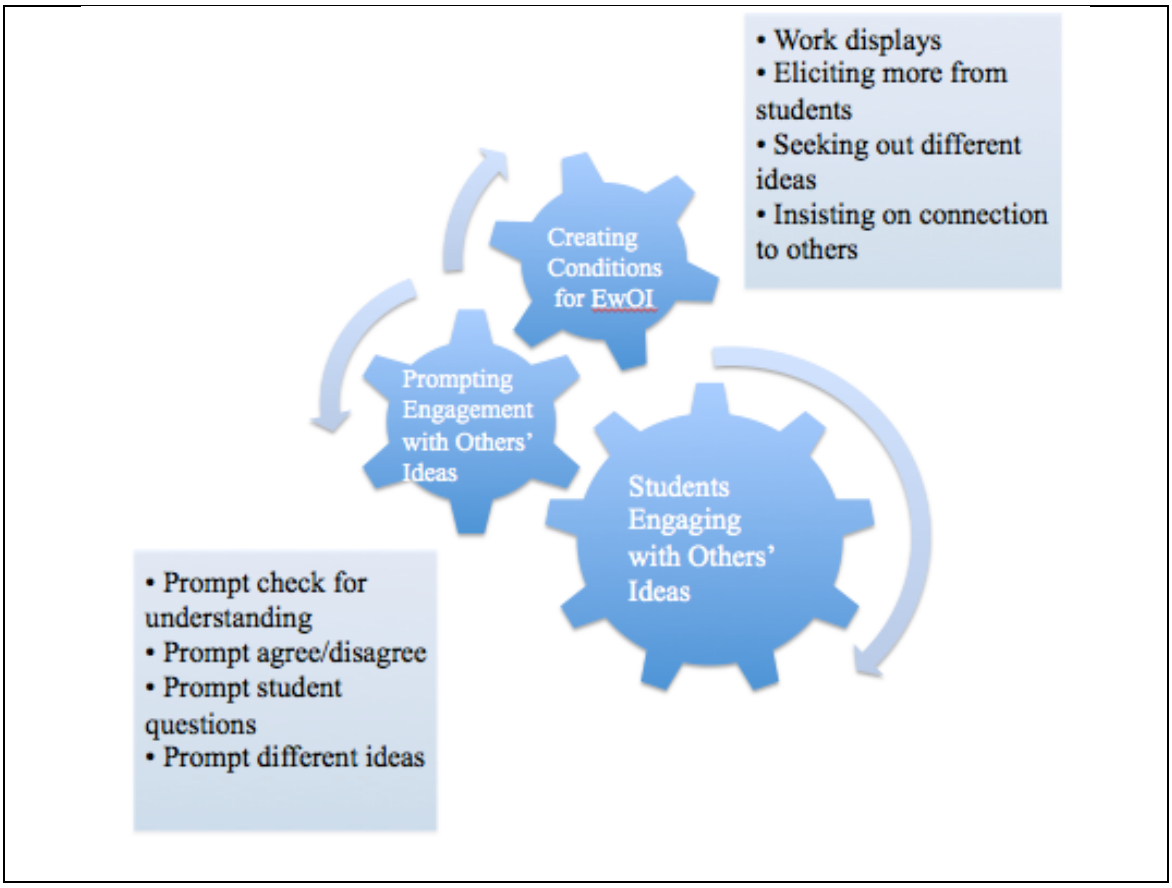
A number of findings from this study stand out as useful for educational practice. First and foremost, this study provides further evidence that elementary school students are capable of having sophisticated discussions where they respond to and reference one another's ideas. Students might do this work in a number of ways – by asking questions of one another, making suggestions to one another, and more. Considering the evidence that shows that discussions are supportive of student learning and engaging with others' ideas in sophisticated ways is associated with learning outcomes, districts, schools and teachers would be well-served to support students in engaging with others' ideas throughout the school day.

An important note for those working to help students do this work, however, is that students may engage with others' ideas differently by subject matter. In particular, results from this study suggest that students will be more critical of one another's ideas in mathematics, and be open to a variety of interpretations of text in literacy. Teachers would be well-served to make explicit to students that discussions within subject-matters may lend themselves to using

particular types of evidence or argument structures that may differ by discipline. This is a challenge for both teachers who only see particular students for particular subjects, and for elementary school teachers who are charged with teaching students in multiple subjects.

At the same time, teachers can support students by using a predictable set of moves and prompts that will likely stimulate engaging with others' ideas in all subject matters. These include asking students to ask questions of one another, to solicit each other's input, and to disagree and agree with one another. Although Ms. Kanzer took the lead role in using these moves, students in her classroom often engaged in these moves without her prompting, which suggests that students internalized these moves and used them eventually. Teachers would be wise to support students in doing this work independently by providing prompts to students such as "I'm not sure what you're saying. Can you repeat that?" or "This is just like _____'s solution from last week/month because _____." These prompts would need to be taught to students and modeled by the teacher before becoming part of the fabric of discussions in the classroom. Ms. Kanzer and other teachers would be wise to scaffold students towards helping students engaging with others' ideas with independence. In Figure 19, I present my understanding of the relationship between Ms. Kanzer's support moves and the ways that students engaged with others' ideas. This study did not look specifically at when Ms. Kanzer's moves led to particular ways of students engaging with others' ideas. Yet it is clear that Ms. Kanzer continually facilitated classroom discussion in ways that led to students engaging with others' ideas. The graphic below shows how Ms. Kanzer's discussion facilitation continually interacted with the ways that students spoke to one another during small group and whole group discussions.

Figure 18. How Ms. Kanzer's teaching moves connected to students EwOI



This study also reinforces the idea that effective discussion facilitation is about more than implementing a set of moves. Ms. Kanzer's stance towards children and attention to their relationships with one another played a role in her success at creating conditions for discussion in her classroom. She appreciated the diversity of her classroom of students, took an open stance towards their ideas, and taught them to listen to one another. Without even one of these crucial elements of her practice, Ms. Kanzer's students may not have engaged with others' ideas so readily. Teacher educators, professional developers, and administrators charged with supervising teachers should make sure to emphasize both specific practices and broader dispositions when helping students lead effective discussions.

This study also suggests that practitioners must consider socially-constructed authority and the way it shapes how students engage with others' ideas. In numerous interactions over

content in Ms. Kanzer's class, students' ideas seemed to be weighed less on merit than based on who communicated these ideas and the power dynamics between this student and their classmates. These power dynamics seemed at least in part to be related to student identities. Though this study did not explicitly focus on how teachers might best intervene to equalize status and authority differences between students, Ms. Kanzer's practice showed that the teacher's involvement could serve to either improve or worsen the effects of socially-constructed authority on how students engaged with others' ideas. Teacher education and professional development programs could help mitigate power imbalances by teaching students effective interventions such as how to assign competence (Featherstone, 2011) to low-status, low-authority students.

Finally, practitioners should recognize that discussions where students engage with others' ideas provide students with ample opportunities to learn. In particular, students in Ms. Kanzer's class had opportunities to learn about not only the topics at hand but also disciplinary practices such as argumentation. Furthermore, engaging with others' ideas provided students with an image of subject matter that runs counter to traditional narratives. Rather than experiencing reading and mathematics as disciplines dominated by seatwork, students in Ms. Kanzer's classroom had the opportunity to see that communication and interpretation were important to these subject matters. Teachers and those who work in schools should recognize that academic discussions are not only a route to learning that can be measured by standardized tests, but also to learning broader practices (e.g. aspects of the Standards for Mathematical Practice) that can persist with students throughout their academic career.

Finally, and in addition to each of these benefits, educational practitioners should also consider that providing students with opportunities to engage with others' ideas may help them

to develop as citizens while they develop as young scholars. Prior research suggests that teachers can simultaneously work on multiple goals (Lampert, 1985; Ball, 1993). Though testing the relationship between engaging with others' ideas and citizenship development was beyond the scope of this study, prior research suggests that learning to engage with others' ideas is an important part of learning to participate in a democracy (Shreiner, 2014). In combination with the academic benefits of classroom discussions, the potential for students to develop as citizens while developing subject matter knowledge makes a powerful argument for making opportunities to engage with others' ideas a consistent part of students' time at school.

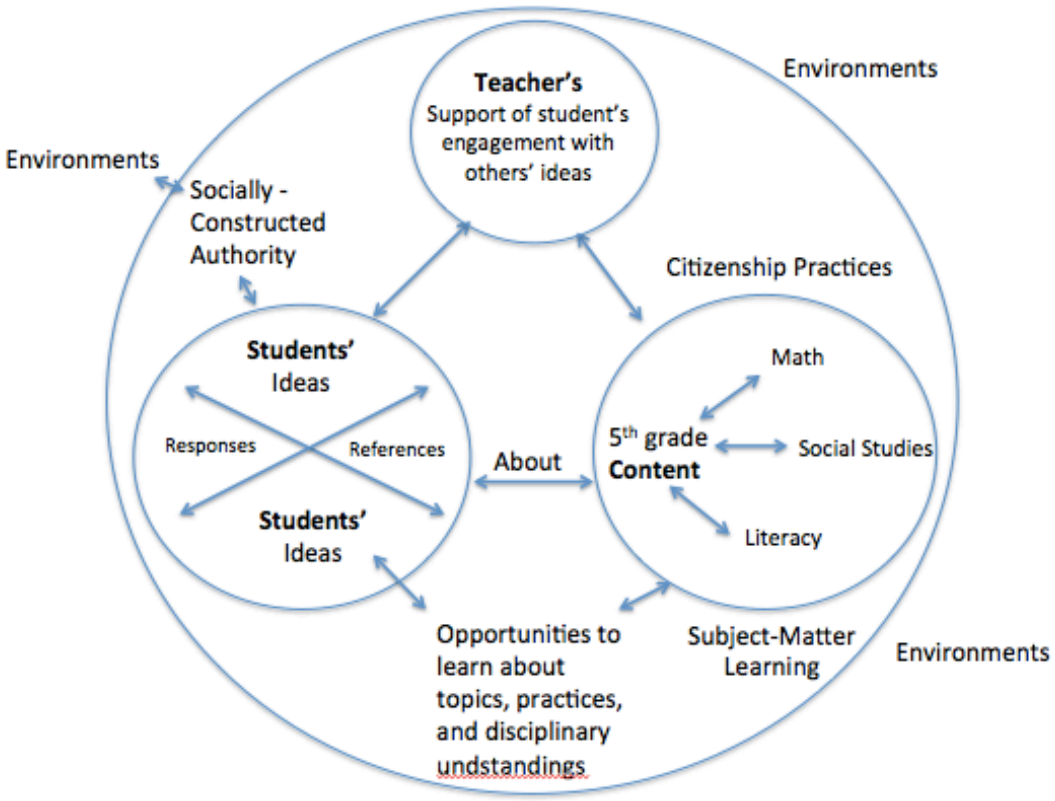
Implications for Research

I approached my study of how students engage with others' ideas from a perspective of sociocognitive theory, which suggests that the thinking of individuals is influenced by their shared participation in a community of learners (Lave, 1991). With this theoretical basis in mind, I borrowed heavily from the instructional triangle proposed by Cohen, Raudenbush and Ball (2003) in order to construct my own conceptual framework for how students engage with others' ideas. In building on the work of these scholars, my conceptual framework (see Figure 11) highlighted how students in elementary school study multiple subject areas, and that teachers play a key role in supporting students in engaging with others' ideas.

The findings from this study have led me to revise my conceptual framework in a few important ways. First, within the "student ideas" vertex, I specify that instances of students engaging with others' ideas tend to either be responses or references to one another's ideas. I found that students engaged with others' ideas in a variety of ways, though for the purposes of effective and concise visual representation of the phenomenon of interest, I simply present these ways of engaging as responses or references. Second, I represent socially-constructed authority

within the framework now because of the key role it seems to play in how students engage with others' ideas. Third, I specify that students have the opportunities to learn topics, disciplinary practices, and disciplinary understandings when engaging with others' ideas.

Figure 19. Revised conceptual framework.



Careful analysis of this conceptual framework suggests a number of places that could benefit from further study. First and foremost, I name "subject-matter learning" and "citizenship development" as the two desired outcomes of the study of subject matter content, but the connection between engaging with others' ideas and these areas could use further study. Although some research in mathematics education has established a link between engaging with others' ideas and student learning, researchers in literacy and social studies have yet to examine whether this link holds true in their fields. In essence, I recommend that researchers who focus

on discussion in the subject areas devote attention to the effects of discussions where students engage with others' ideas on student learning. Likewise, the connection between engaging with others' ideas and citizenship development is largely theoretical with some exceptions (e.g., Hess 2009; Hess & McEvoy 2014). Empirical studies that identify and examine the citizenship outcomes of engaging with others' ideas would be important to moving this body of work forward.

Second, researchers should continue to look at how students engage with others' ideas in multiple subject areas. This study identifies some similarities and differences in how students engage with others' ideas by subject area, but more research is needed to determine how teachers might support rigorous student-to-student talk in multiple disciplines. When considering elementary school teaching and learning, it may be more efficient and practical for teachers to use common frameworks and moves for leading discussions in multiple subject areas. On the other hand, these subject matter-neutral moves may paper over some of the important decisions that teachers have to make based on the content at hand and norms of the discipline being discussed. More studies that keep elementary school teaching whole would allow for more coordination among university-based teacher education programs, and greater depth of implementation from elementary school teachers.

Finally, researchers interested in engaging with others' ideas must be sure to examine teachers' dispositions toward students, subject matter knowledge, and curricular decision-making in order to understand how to give students more opportunities to engage with others' ideas. In this study, I found that Ms. Kanzer's ability to create a sense-making environment and attend to student relationships was crucial to creating classroom conditions where students could engage with others' ideas. It is quite possible that other dispositions are crucial to helping students with

this work. For example, supporting students in engaging with others' ideas necessitates that teachers relinquish some amount of control over the content of the discussion, while also making sure to intervene in ways that facilitate discussion of important content. These tensions may be connected to teacher dispositions that could be identified, studied, and taught. In the realm of subject-matter understandings, Ms. Kanzer held strong beliefs about mathematics as a discipline of communication. Would teachers with other beliefs and understandings about mathematics be able to facilitate student engagement with others' ideas? This is an outstanding question. Finally, researchers could examine which curricula lend themselves to student engagement with others' ideas, and how teacher decisions constrained or extended the opportunities for discussion provided by these curricula.

APPENDIX A

Parent Consent Form

Dear Parents or Guardian,

My name is Peter Cipparone and I am a former 4th grade teacher and current principal intern at Sullivan School. With the permission of Ms. Kanzer I am inviting your student to participate in a research study about the discussions your student have during literacy, math and social studies.

I would like to take notes on the class and audio record student conversations as part of this project. I would also like to collect and study student work and talk to student between activities. The study will take place during January and February.

Benefits: Your student will have an extra adult in the classroom at times. Also the study may help student in this class and other classes have better discussions

Risks: There are no risks to participating in the study.

Privacy: The audio recordings and student work from this study will be kept and listened to only by Ms. Kanzer and myself. I will change all names of student in the study.

Participation: Participation is completely voluntary. Even if you decide to participate now, you may change your mind and stop at any time.

Please contact me with any questions regarding this research project. I am happy to speak further about this work.

Thank you for your time and consideration.

Sincerely,

Peter Cipparone
Doctoral Candidate
University of Michigan
Email: pcipparo@umich.edu

Do you voluntarily allow **your student's classwork** to be included in this study?

Yes ☐ No ☐

Do you voluntarily allow **your student to be audio recorded** during the regular classroom instruction**?**

Yes ☐ No ☐

Do you voluntarily allow **your student to participate in informal interviews during** this study?

Yes ☐ No ☐

Parent Consent Form (Continued)

(Student's Printed Name) (Parent/Guardian's Phone and Email)

Background information about your student (Optional)
(Please note: you have the right to skip any questions you do not wish to answer; this information will never be reported with names or other identifying information):

Student's gender: Female ☐ Male ☐

Student's race/ethnicity:
☐ American Indian/Alaskan Native
☐ Asian
☐ Black or African American
☐ Native Hawaiian or Pacific Islander
☐ White
☐ Hispanic or Latino
☐ Not Hispanic or Latino
☐ Multiracial
☐ Other: _____

Language(s) spoken in your home: _____

Services that your student receives:

☐ Special Education
☐ Title I for Reading or Math
☐ Visits the Reading Specialist
☐ Gifted/Talented Services
☐ English as a Second Language
☐ Other: _____

Does your student qualify for free or reduced price lunch?

Yes ☐ No ☐

APPENDIX B

Student Assent Form

Dear student,

Hi! You already know that my name is Peter Cipparone, and I am doing a study about how you talk to each other during classroom time. I'm also going to be studying how your teacher helps you work well together. I'm doing this study so that other researchers and teachers can learn from you and your teacher.

During this study, I would like to study conversations you have with your classmates. In order to do this, I would like to audio record your conversations. This means that you could sometimes have an audio recorder near your desk while you talk in a small group or whole group. I may also want to talk with you briefly between classroom activities. Finally, I would like to collect work you do during class and some assessments you do.

You can participate if you would like to, but you do not have to. If you choose to participate, I will make sure to be aware of your privacy. For example, I will make sure not to share your real name with anyone. You also have the right to stop participating at any time if you would like to.

If you sign below, it means that you would like to participate in this study. Thank you so much for thinking about it. I would love to have as many students participate as possible!

Your signature: _____

Your name (printed): _____

Date:_____

APPENDIX C

Teacher Consent Form

SCHOOL OF EDUCATION
EDUCATIONAL STUDIES
UNIVERSITY OF MICHIGAN

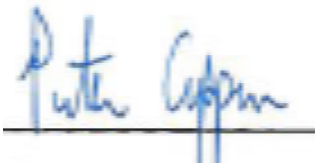
Dear Ms. Kanzer,

My name is Peter Cipparone, and I am a doctoral student in Educational Studies at the University of Michigan. Before that, I taught fourth grade for four years in the New York City Public Schools.

Over the past two years, I've become interested in discourse in the elementary school classroom. In particular, I'm interested in *how* student engage with one another's ideas. I see the ability to explain oneself, to listen to others' explanations, and to build ideas together as crucial skills for student to develop. I'm interested in how this happens in literacy, math and social studies. I want to try to find out how student engage with one another's ideas, what teachers do to create opportunities for student to engage with one another's ideas, and how this might relate to civics and social studies standards that are intended to nurture young citizens.

I would love to have you participate and be a partner in this research. I hope to conduct this research during January and February. This will primarily involve daily observations in your classroom in this time period and two 30-60 minute interviews with you, one before and after the research begins. On the back page is a more detailed list of what participating would involve, and a consent form if you choose to participate.

Thank you so much for the consideration – I really appreciate it.



Consent Form

TIME INVOLVEMENT: There is no formal time involvement for participating in this study outside of normal hours when you are teaching. If you would like, I would love to be in periodic communication with you about what I am seeing in the classroom, but this is only at your convenience.

DATA COLLECTION: There will be a number of types of data I will collect during this study. I would like to observe in your classroom at least 4 days a week for a period of about 6 weeks. I would also like to interview you for 30-60 minutes once before and after the research. I would also like to collect artifacts of your teaching such as pertinent lesson plans. Finally, I would like

to collect student work and classroom assessments for five focal student whose discussions I try to record. I will choose these students with your consult.

This data will remain on a password-protected cloud-based storage system. No one will have access to this data except myself and my doctoral dissertation advisor.

RISKS AND BENEFITS: There are no foreseeable risks to participants in this study. The primary benefit you may experience from this study is a deeper understanding of answers to the research questions based on your classroom context, which may benefit your student and other student. There is no payment for participation in this study.

PARTICIPANT'S RIGHTS: Please understand your participation in this research is voluntary and you have the right to withdraw your consent or discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled. The alternative is not to participate. You have the right to refuse to answer particular questions. The results of this research study may be presented at scientific or professional meetings or published in scientific journals. You, your student, the school, and the district will remain anonymous in all reporting of research results.

Please respond with any questions. If you consent to participate, please sign below. Thank you!

FORMAL CONSENT: I, _____, consent to participate in a study looking at how student engage with each others' ideas in literacy and math, and how teachers help them do so.

SIGNATURE: _____

DATE:_____

APPENDIX D

Teacher Interview Protocols

Pre-Data Collection and Post-Data Collection Interview (~30-45 minutes)

Purpose: This interview will give me information about how the focal teacher thinks about student' engagement with others' ideas, and how they create classroom conditions that support student' engagement with one another's ideas.

Participant: Ms. Kanzer

Structure: One-on-one interview

Timing: Interviews will occur before and after the month-long data collection period

1. INTRODUCTION

A. Thank you for meeting me, Ms. Kanzer. I have a few questions for you about how student engage in each others' ideas, how this relates to classroom performance, and how you think you can best support this work.

2. VIEWS ON DISCUSSION

A. What would you say is the role of discussion in your teaching?
B. Is discussing things something you think is important? Why teach with discussion?
C. What's challenging about discussion?
D. What makes discussion work well?
E. What do you do to prepare for small or whole group discussion?
F. What would you say your strengths and weaknesses are as a discussion facilitator?

3. STUDENT' ENAGEMENT WITH OTHERS' IDEAS

A. What do you notice about how student how respond to one another when they share ideas?
B. Do you see this as differing by subject? Do student respond to and interact with one another's ideas differently in math and literacy, for example, or similarly? How about social studies?
C. Do you see this as differing when they are in small group or whole group discussions?
D. Status and Authority
    a. Are there student in your classroom who you would say have higher and lower status? Who are they? Where do the focal student fall?
    b. How would you say this status plays in to small group work or whole class discussions?
    c. What role does student' status and authority play in how student engage in one another's ideas?

4. SUPPORTING STUDENT' ENGAGEMENT WITH OTHERS' IDEAS

A. General conditions

- *a. Describe your ideal classroom environment*
- *b. What do you do in the beginning of the year to build community among your class? Do you see this as having any impact on how student engage in one another's ideas? Explain?*
- *c. What norms and routines do you have in your classroom that help student engage in one another's ideas?*

B. Understanding of subject-matter

- *a. Subject Matter Knowledge*
  - *i. What does mathematics mean to you?*
  - *ii. What is math like for you as a learner?*
  - *iii. What are some important core concepts or topics in math?*
  - *iv. What are important skills or practices of mathematicians?*
- *b. Pedagogical Content Knowledge*
  - *i. What does it mean to study mathematics in school?*
  - *ii. What are some of the principles behind your math teaching?*
  - *iii. What aspects of mathematics are most important for your student to learn before they leave your class at the end of the year? Why are these things important?*
- *c. (Repeat for literacy and social studies)*

C. Curriculum

- *a. What curriculum are you supposed to use in math? Do you use it? Why or why not?*
- *b. What do you think of the curriculum? What do you think are its strengths and weaknesses?*
- *c. Do you have to use the curriculum? If not, would you use it if you had a choice?*
- *d. When you use the curriculum, do you use it as is, or adapt it? How do you adapt it? What other curricular resources do you rely on?*
- *e. Do you try to teach similar lessons to your grade level colleagues? Why or why not?*
- *f. Where are the opportunities for student to engage in one another's ideas in the math curriculum? Do you adapt the curriculum to create more opportunities for student to engage in one another's ideas? How so?*
- *g. (Repeat for literacy and social studies)*

D. Moves

- *a. Are there specific things or moves you sometimes do to help student respond to one another's ideas?*
- *b. Do you see a pattern in terms of what helps student engage in one another's ideas? Is there something specific that happens before student engage in one another's ideas?*

5. REFLECTIONS ON A RECORDING OF A DISCUSSION PROTOCOL
   a. To be followed during both the pre-data collection interview and the post-data collection interview.

b. In the pre-observation interview, the teacher will reflect on a recording of a discussion in social studies (see Appendix E for a transcript of the discussion that the teacher will listen to). In the post-observation interview, the teacher will reflect on a transcript of discussion among some of her student.
c. After the teacher reads the transcript, I will ask the following questions
    i. What do you notice about the discussion?
    ii. What do you think are the strengths of what happened during the discussion?
    iii. What are the weaknesses of what happened during the discussion?
    iv. Do you see student as engaged in one another's ideas here? Why or why not?
    v. What would you think had to happen before in the classroom for student to be engaged in this discussion?

Weekly Interview (~15 minutes)

Purpose: This interview will give me information about how the focal teacher thinks about student' engagement with others' ideas, and how they create classroom conditions that support student' engagement with one another's ideas.

Participant: Ms. Kanzer

Structure: One-on-one interview

Timing: Interviews will occur on Friday afternoons after school for about 15 minutes

1. WEEK-IN-REVIEW

A. How was your week?
B. Did you have any important observations about any of the five focal student this week?
C. What opportunities did student have to discuss ideas with one another in literacy, math, or social studies this week? What about these opportunities was successful or challenging?

2. REFLECTIONS ON A RECORDING

a. I will choose a short clip (less than 2 minutes) of student engaging in one another's ideas that I will play back for the teacher. I will choose a clip I think of as high-level engaging in others' ideas. I will then ask the teacher the following questions:

A. What are your thoughts about this clip?
B. What norms or conditions, either put in place now or earlier in the year, do you think enable student to have this type of exchange?
C. What is the status or authority of student speaking and listening in this clip? Do you see any issues of status or authority going on here?

D. *Would you say this exchange provided student opportunities to learn math/literacy/social studies? Why or why not? What about math/literacy/social studies do you see student learning here?*
E. *From a curriculum level, what allowed this type of talk to happen? Would you say this is part of the curriculum? If not, what decisions did you make about the curriculum to allow this type of talk to happen?*

APPENDIX E

Pre-Observation Teacher Interview Transcript

Adapted from the TeachingWorks Resource Library, with credit to the Core Practice Consortium, the TeachingWorks Centers Project History-Social Science Team, and the University of Michigan History-Social Science Methods Planning Group.

Read the lesson segment below. In this lesson segment, student are discussing why the second map is different than the first map.

What do you see on the map?
Why is that what you see?

State Map of Michigan. One World Online Project. 2013

What do you see on the map?
Why is that what you see?

Map of Michigan by Guillaume de L'Isle, 1718.

Tim: I also kind of disagree with Lucas's idea about that Michigan wasn't really formed yet. I-I-I think, um, that since they didn't have satellites, they couldn't really make out the shape of Michigan that well. They had to walk all around Michigan making the map.

Teacher: Would anyone like to respond to Tim's response to Lucy? Great listening to each other. That maybe it wasn't that it wasn't formed yet, but just that ... yeah, Charlie.

Charlie: Well I agree with him, um, but maybe some ... like he said, um, that, um, they had to walk around Michigan to kind of form the map, but they couldn't, um, but maybe there was some parts that they couldn't walk through, like maybe some, um, swampy area that, like, not saying we have swampy areas, but maybe at the time they couldn't walk ... walk that, walk that so they couldn't form out the shapes.

Teacher: Okay, that's-that's a great response to the conversation. What do you think,

Alex?

Um, I sort of agree with Tim too. But I believe there could be like a swamp, like somewhere that was blocking their path, because if I remember correctly, I remember that it was sort of like Michigan was really swampy, they thought. They thought Michigan used to be really swampy.

Teacher: Great. Great drawing on your background knowledge. So who agrees with what Tim, Charlie, and Alex are discussing, that the reason the shape may look different is because they didn't have as good of technology? Thumbs up if you agree that maybe it was different because of different technology. Kind of? Jessica why kind of?

Jessica: I think it might have ... I think it might have not been fully formed, or it's because they walked around, and I think it was both, because it was deformed a little, because that was a long time ago too, like 300 years ago.

Teacher: You're right, it was a long time ago. Yeah, Damion, would you like to add on?

Damion: Also, like, um, I think there was, um, a land bridge in here somewhere, right there. Yeah, somewhere over there at the top which they ... it might have been flooded during the summertime if they were doing this. It could have been flooded and they couldn't get to Mackinac Island, so they just had to guess.

APPENDIX F

Student Interview Protocol

Purpose: Impromptu student interviews will give me information about how student with others' ideas.

Participant: The participants will be student in the classroom who have not spoken during a discussion, or whose ideas I want to better understand

Structure: One-on-one interview

Timing: Interviews will occur after activities while transitioning from one subject to another or one lesson format to another (from the rug to desks, for example)

Possible Questions: Questions for these activities will be highly dependent on other student' comments. That said, some possible questions I could ask might be:

1. I saw you with your hand up but Ms. Kanzer didn't call on you. What did you want to say?

2. Did _____'s idea make sense to you? What part of it made sense and what didn't?

3. Did you agree more with _____'s idea or _____'s idea? Why?

4. Did you learn anything from the discussion that just happened? What?

5. I saw that you changed your mind. What caused you to change your mind?

6. (Math) If you faced a similar problem to the one we just talked about, how would you go about solving it?

7. (Literacy) What new ideas about (character) are you having after this discussion?

8. (Social Studies) What new ideas about the American Revolution are you having after this discussion.

APPENDIX G
Sample Summary Notes Page

Table 13. Sample summary notes page

Segment of Instruction	Students I spent time with	Assignment/Activity	Teacher Role	Thoughts and Wonderings	Time Stamps
Math	Calvin, Oscar	• Students mostly played a fraction game where they tried to make a whole. Calvin and Oscar didn't talk about their ideas much, mostly played the game in parallel	• Circulated throughout, worked particularly with Hannah	Are their ways to structure math games that might involve more talk?	8:42 – 9:38
Reading	Calvin, but heard all groups because it was a whole class discussion	• Ms. Kanzer plays aloud a chapter of Bud Not Buddy that students read the previous night, and students shared sticky notes and responded to one another's ideas. Lots of good discussion ensues, such as the	• Facilitated discussion	Does the preparation of the sticky notes help students, or could they have that conversation if kids were reading this for the first time?	10:46 – 11:15
Writing	Calvin, Bobby	• Students write a flash draft of their first literary essay, an essay about the book *Fox.* Mostly writing, not much EwOI	• Circulated, spent time with Alonso, Amariah	What does EwOI look like in writing? I've only seen a bit of partner feedback	1:38 – 2:20

Ideas to Follow Up On with Students and Teacher

• Ask Calvin what he thinks of the math game, whether it helps him learn and how so

• Talk to Ms. Kanzer about the discussion of *Bud, not Buddy* and her thinking behind playing the tape rather than reading aloud, and also how she balances getting through the book while also having rich discussions.

APPENDIX H

Jottings and Field Notes Sample

1/8/19, Sharing Several Brownies Share opening

Jottings

1/8/19 Math, whole class share

- Ms. Kanzer rings bell, frames by telling the kids to have labels and listen to each other
- Pulls Dan's name out of the popsicle stick jar, Dan goes up too, both explain their work
- Ms. Kanzer interrupts to make sure people can hear both speakers, they get a microphone to make sure everyone can hear them
- Dan asks for feedback unprompted
- Randy asks a question and Ms. Kanzer prompts for Dan to revise but Randy thinks its good already.
- Ms. Kanzer takes Randy's suggestion and tells the whole class to do it.

Field Notes

1/8/19 Sharing Brownies share - Ms. Kanzer rings the bell and calls the class together. We're going to share some of our work now, just on Several Brownies, she says. Your work should be telling a story, she continues. You should have labels, and you should listen to each other. She pulls a popsicle stick, and she reads Dan's name. Me too? Calls out Bobby expectantly. Yeah come on up Ms. Kanzer says. Dan and Bobby walks up to the front and Bobby puts his work on the document camera. Bobby stands off to the side and begins to explain his work. There are 5 brownies and each person gets one brownie because there are five people

Can you all hear him? Ms. Kanzer interrupts. Students call out a chorus of yes, but she hears a no. Speak louder and clearer, Ms. Kanzer prompts. Bobby rushes to go get a microphone, which the class often uses to help students here. I don't want that Dan tells him. Bobby goes and gets it anyway. Bobby returns and starts again.

Dan finishes his questions and asks for questions and comments. Are you trying to show that the blue brownie goes to the blue guy? Asks Randy. Yeah said Dan. Could he make that clearer? Asks Ms. Kanzer. It's actually really clear says Randy. But could he label his pictures? What does label mean? Ms. Kanzer calls on a couple students who define label. Ms. Kanzer then directs Dan to label his picture. Go ahead and look at your own pictures and make sure they're labeled, Ms. Kanzer tells the rest of the class

APPENDIX I

Sample of Coded Data, Engaging with Others' Ideas

Table 14. Coding scheme and codes applied (n= 49 discussions)	
Responding to others' ideas	
Adding on	Tara: This is also message to teachers. Pay attention, listen to what the kids are saying before dissing on them. Dan: Yeah, I don't think Mrs. Price is a very good teacher.
Trying to understand another student's idea	Haley: I'm confused. Can you write something out on the board so that we can understand it more? Like, can you show what you were doing?
Agreeing	Dan: I think it taught her to speak up. Tara: Yeah, like you need to protest something to get what you want. Dan: Right.
Answering student questions	Calvin: What's the point of this? I mean, I also just don't really get the point of the story.
Disagreeing	Bobby: So, you used the whole thing to make seven eighths? Hannah: It's still seven eighths, it's just different. Bobby: No, it's not seven eighths. Hannah: No, it is seven eighths. Bobby: That's seven twenty-fourths.
Critiquing	Bobby: I was thinking that everyone could have a microphone, and like they could just measure the volume on each microphone. Calvin: Why would everyone have a microphone? That's a lot of microphones. Bobby: No, not everyone. Like each table, they would have a microphone hanging down from the ceiling
Making suggestions	Sorah: I got a totally different answer from you and looking at your work is very overwhelming because there's a lot of numbers. I think you could space it out a little more, because it's like one big equation.
Complimenting	Amelia: I really liked your strategy because it was very clear and I could understand the pictures and numbers.

Prompting another student	Calvin: Okay so what are you going to do next on this problem? Maybe draw the people?
Referencing others' ideas	
Explaining or rephrasing	Rebecca (whispering): What? I don't understand anything she just said. Iris (whispering to Rebecca): Okay, so Rebecca, [Tara] made the two extra brownies into two 100s and she's dividing both of them in five.
Connecting to another student's idea	Kevin: I did it like Dan did it. Instead of saying that everybody ... Instead of dividing two of the brownies up, I divided all of them, and I divided them into five pieces because there were five people. Each person would get one of the brownies.
Contrasting with another student's idea	Alonso: Um, well yours is different than Amariah's because, like, you're talking about emotions like feelings, like how Bud keeps in his feelings from everybody a little bit, in your answer and in your analysis
Referencing an idea from a previous day	Iris: Did you guys see that? This is kinda like yesterday where you could write equations that were subtraction ones or addition ones.

APPENDIX J

Studying *What* is Being Discussed in a Math and Literacy Discussion

Table 15. Analyzing *what* is being discussed in the Amelia's Work math discussion

Student comment	Does this count as an idea, and what kind of idea is this?	What is happening during this segment of the discussion?	How does engagement with others' ideas further the discussion?	*Who* is doing what type of intellectual work in this discussion?
Ms. Kanzer: Who would like to show a number strategy for solving the first problem? Now, the number way might have been much trickier for you. That's okay, because if somebody shares, you could try the number strategy too. Amelia, could you give that a try? If this was challenging, your mind is alert and your pencil might be moving. Go ahead, Amelia. Let's watch her.	No – Ms. Kanzer invites a student to share their thinking by After no one responds, she asks Amelia to present her solution.	Ms. Kanzer asks Amelia to explain a "number strategy" for solving the first problem, in contrast to a 'picture strategy' that someone responded to previously. This means that the conversational space for the discussion is on what strategy Amelia used to solve the problem. Therefore, Ms. Kanzer is launching what some scholars of mathematics refer to as an "open strategy share" (Kazemi & Stipek, 2014). - Ms. Kanzer sets expectations for engagement with	Ms. Kanzer makes the choice to ask students to present a "number strategy." She therefore puts the focus on a *strategy* for solving the problem 3½ - 1¾ = ___. In other words, Ms. Kanzer centers the conversational space in this discussion on strategy, rather than solution.	Ms. Kanzer is doing intellectual work by centering the conversational space on a "number strategy." The discussion then proceeds as an open strategy share (Kazemi & Stipek, 2014).

		Amelia's explanation by asking students to have their 'mind alert'		
Amelia: What I did is three minus one equals two, and then I did one half minus three-fourths equals negative one fourth. And then two minus one fourth equals one and three fourths. And then down here I checked my work using addition. I did one and three fourths plus one and three fourths and then three and one half. Then this would equal one and three-fourths	Yes – I consider this a mathematical idea because Amelia is arguing that she has a valid strategy for solving 3½ - 1¾. Though one could interpret Amelia's argument as a procedure, I interpret Amelia's decision to subtract wholes (3 – 1 = 2) then fractional parts (½ – ¾ = - ¼) before combining these partial sums as a mathematical argument because she uses mathematical reasoning to use this strategy and solution.	- Amelia provides an explanation for how she solves 3½ - 1¾ = ___. - She describes what numbers she took apart in order to solve 3 and ½ minus 1 and ¾. - Implicit in her procedural explanation are the following mathematical understandings. These are not highlighted by Amelia or the teacher in her initial explanation, although other students shed light on some of these ideas later on in the discussion. - Mixed numbers can be decomposed and recomposed in a variety of ways (e.g. splitting the problem into 3-1 and ½ - ¾) - The	Amelia publicly explains how she solves 3½ - 1¾ = ___. In doing so, she provides peers with another way of approaching the problem. This type of sharing is a primary benefit group discussion.	Amelia is doing the intellectual work by providing a mathematical argument.

		operations (+, -, x, /) apply to both whole numbers and fractions - A system of negative numbers exists, and -1/4 is similar to subtracting one fourth. - Subtraction and addition are inverse operations, and addition can be used to check the accuracy of subtraction		
Bobby (raises hand, called on by Ms. Kanzer): I have a comment. I would have never thought to do addition to check my answer on a problem with fractions. Amelia: Thanks, yeah I usually do that when I solve any subtraction problem	No - Bobby engages with Amelia's mathematical argument, rather than posing an idea of his own.	- Bobby engages with the second half of Amelia's explanation, where she describes using addition to check her work. - Bobby states that he "never thought to do addition to check it," perhaps implying that he learned something new, and had a less secure understanding of subtraction and addition as inverse operations. - Bobby	Bobby furthers the discussion by focusing it on the inverse relationship between addition and subtraction. Considering the relationship between operations is important mathematical work. However, others do not take up this work.	Bobby positively positions Amelia's work; Amelia accepts this positive positioning

		positively positions Amelia's work by saying that her work was "cool" and that he'd never thought to do addition to check it.		
Haley (raises hand, called on by Ms. Kanzer): Amelia I like your strategy of subtracting fractions, but that makes a negative fraction. Does that really work? Amelia: Yeah, it works, and I basically know that you can make negative fractions, and they're kind of like opposites of positive fractions Haley: That makes sense I didn't think of that.	No - Haley engages with Amelia's mathematical argument rather than posing her own idea.	- Haley engages with a different part of Amelia's mathematical argument – that one can subtract ¾ from ½ as part of solving the larger problem - By asking whether subtracting ¾ from ½ "really works," Haley is asking about the "rules" of the system of rational numbers and operations within that system. In other words, Haley asks if the system of rational numbers allows you to subtract to create a negative. - It is not clear whether Haley understands that one might be able to subtract integers to get a negative number (e.g. 1 – 2 = -1) or	Haley furthers the discussion by focusing on whether creating a negative number "works." Haley's contribution helps highlight the way the number system works in a way that would not have been brought out if she didn't engage in Amelia's idea.	Both Haley and Amelia engage in intellectual work here; Haley's question concerns not only Amelia's idea but the number system in general, and Amelia deepens her mathematical argument.

		if the idea of negative fractions is what she has questions about. - Haley's response to Amelia exposes Amelia's understanding of the number system, providing her the opportunity to make the claim that negative fractions are "kind of like the opposites of positive fractions"		
Ms. Kanzer: Haley, that was really great how you asked that question and Amelia explained it to you. That's really important math work. Could you explain Amelia's strategy in your own words now? Haley: She subtracted one half (pause) she subtracted one half	No - this segment is still focused on Amelia's idea, because Ms. Kanzer asks Haley to restate Amelia's idea rather than pose one of her own.	- Ms. Kanzer highlights the way in which Haley asked a question, therefore spotlighting the way in which Haley engaged with Amelia's idea, rather than the content at hand - Ms. Kanzer prompts Haley to explain Amelia's idea in another way. Haley's explanation does not seem to differ substantively from Amelia's explanation - Ms. Kanzer	Ms. Kanzer's request for Haley to repeat Amelia's strategy refocuses the conversational space on Amelia's strategy, rather than on the mathematics brought up by other students. This may be a missed opportunity. At the same time, Ms. Kanzer also makes clear that asking questions is "important mathematical work," which may communicate to students that	Ms. Kanzer recognizes and calls out a strength in Haley's question Haley also engages in a form of mathematical work by reformulating Amelia's explanation in her own words.

minus three fourths, which is equal to negative one fourth. Then when you think of doing it negative, and then two minus one fourth is equal to one and three fourths.		points Haley towards considering adopting Amelia's "strategy" with her question. This may be aimed at helping students incorporate others' mathematical practices. • It remains unclear precisely what "strategy" Ms. Kanzer wants Haley to consider trying	habits of mathematicians are important, in addition to solutions.	

Waiting in Line in *Bud, Not Buddy* Discussion

Table 16. Analyzing *what* is being discussed in the Waiting in Line literacy discussion

Student comment	Does this count as an idea, and what kind of idea is this?	What is happening during this segment of the discussion?	What does this do to further the discussion?	Who is doing what type of intellectual work during this segment of this discussion?
(Text of Bud, not Buddy read aloud just before discussion) *"Line's closed. These here folks are the last ones."* *It was time to start lying. If I didn't get any food now I'd have to steal something out of someone's garbage or I wouldn't be able to eat until the mission opened for supper.* *I said, "Sir, I". The man raised his hand.* Alonso: I	Yes – this counts as an idea. Alonso is questioning the main character's motivation for cutting in line.	Alonso questions the main character's motivation is for cutting the line. This suggests that Alonso may have the following understandings about reading fiction • Characters don't act randomly but rather take actions for a reason • Readers should monitor whether they understand why a character is acting the way they are, and if not, the reader should stop and ask "why" or reread the text carefully	By asking a question of the text, Alonso opens up the text and characters within it for critical review from the class. Asking questions of text is a form of comprehension that can further group discussions.	Alonso does the intellectual work of asking a question. This opens space for others to do the intellectual work of considering and responding to his question.

don't really understand why can't Bud just wait in the line. I mean why can't he just wait like everybody else?				
Ms. Kanzer: Responses? Cassie: Well, those people were the last people in line, so he had to go wait with him so he could get food. Ms. Kanzer: Does that answer your question Alonso? If you're not convinced yet you could get some more ideas from people.	No - Cassie's comment is a direct response to Alonso's idea, and Ms. Kanzer interprets it as a response.	In response to Alonso's initial question, Cassie seems to provide an explanation for the character's actions. In saying that Bud "can just wait with them," Cassie seems to be saying that Bud cut the line for a logical reason.	Cassie's comment furthers the discussion by offering an explanation for the character's behavior. Understanding character's motivations is key to text comprehension (CCSS.ELA.RL.3.3)	Cassie offers an explanation for character's behavior. Ms. Kanzer interprets Cassie's comment as a response to Cassie, and invites further participation.
(Alonso calls on Randy) Randy: He's trying to get there in time before the shelter had	No – Randy's comment is a response to Alonso, and Alonso interprets	In his first response, Randy adds part of the setting – the late hour of day – to the discussion,	Randy adds a historical perspective to the discussion. In other words, Randy situates the book and the characters actions in the time and place	Randy, a student who is often pulled out for special education instruction, adds

to close. If he got there earlier he would have time to eat, but when he got there he was sort of late. Alonso: But why? Randy: Well the line has to close at a certain time so they have enough food for tomorrow. Alonso: I'm asking why does the line close at a certain time. Randy: They can't keep serving food all day because it's the Great Depression and they might run out because there are so many people.	Randy's comment as a response to him.	context that helps explain why Bud cuts in line After Alonso probes Randy's response, Randy adds that the shelter has to "have enough food for tomorrow," showing an understanding of the limited food a shelter might have. When Alonso probes his response a second time, Randy mentions another aspect of the setting, the historical context. Use of historical context to inform one's thinking about the book is an important skill for 5th grade readers (CITE)	that they occur. Use of historical context to inform one's thinking about the book is an important skill for 5th grade readers (CITE)	important historical context to the discussion. Alonso also engages in intellectual work here, by not simply accepting Randy's explanations but by probing them until they made sense to him.
Ms. Kanzer: (begins playing the audio of *Bud not Buddy* for a second before seeing Tim's hand	No – Tim's comment responds to Alonso's initial comment about why the main	In his response to Alonso, Tim focuses on the character's current situation – running away – and his personal needs	Tim adds an empathetic, character-centered point-of-view to the discussion by focusing on the characters needs as a motivation for his actions. This provides	Tim does the intellectual work of thinking through why the character might respond in a particular

up) Ms. Kanzer: Oh I'm sorry Tim, do you have something different? Tim: Yeah it's something like Alonso's – I think the reason Bud wanted to get into line first was because he was really hungry, and he needed to get some food because he didn't eat last night because he was running away. Ms. Kanzer: Got it Alonso? Good question.	character needed to cut the line. Ms. Kanzer interprets Tim's comment this way.	as a way to describe his actions. Therefore, the three students who responded to Alonso all provided slightly different explanations for why Bud cut in line. Ms. Kanzer responded neither affirmatively nor negatively to any of these responses.	one further interpretation of the characters motivations (CCSS.ELA.RL.3.3)	way. Ms. Kanzer notices Tim, allows him to enter the conversation, and directs his comment towards Alonso.

APPENDIX K

Analysis of Opportunities to Learn Content in Each Math Discussion

Table 17. Analysis of opportunities to learn content in each math discussion

Date	Title	Math Content Discussed	What happened in this discussion? What was the mathematical focus?	Who did the intellectual work?
1-8	Bobby SG Sharing Brownies	Division with fractional remainders	Bobby tries to show his thinking on the problem while Dan critiques and asks questions of his work on the Several Brownies Problem (sharing 7 brownies among 5 people). Dan's questions and comments are focused on Bobby's representation.	Both Bobby, who is working, and Dan, who looks at Bobby's work analytically.
1-8	Andrea SG Sharing Brownies	Division with fractional remainders	Rose and Andrea explain how they solved the Sharing Several Brownies Problem (sharing 7 brownies among 5 people), referencing their diagrams, without much interchange. Andrea critiques Rose' explanation	Both - through their explanations of their own work, but their engagement with others' ideas is limited.
1-8	Calvin SG Sharing Brownies	Division with fractional remainders	Calvin explains his work on the Several Brownies Problem (sharing 7 brownies among 5 people)., then guides Sam S. through what to do with the remaining brownies through a series of questions.	Calvin primarily – Sam S. is passive throughout the encounter
1-8	Alonso SG Sharing Brownies	Division with fractional remainders, equivalent fractions (Alonso's work)	Alonso tries out an "Algorithm of fractions" in order to solve the problem. Tim asks him questions like "I don't get that" or "Does that work?	Both – Alonso in trying something new/working to solve and Tim in questioning

1-8	Rebecca SG Sharing Brownies	Division of fractional remainders, operations with whole numbers (second problem)	Rebecca challenges Iris's solution then tells her how to represent her work on Sharing Several Brownies. Then Rebecca and Iris decide to solve a problem differently – one with addition and one with subtraction – and compare how these strategies work.	Rebecca primarily
1-9	Whole Class Sharing Brownies	Division with fractional remainders, Equivalent fractions (Tara)	Dan represents his work, then people (Bobby, Alonso, more) comment on his representation. Tara provides another strategy which gets to topics of fraction equivalence and efficiency of strategies	Dan, Tara, Alonso, Randy
1-11	Whole Class Comparing Fractions	Comparing fractions	Discussion focuses on comparing fractions, and rules for doing so; Evan poses a conjecture/large scale idea about numerators and denominators, and other students illustrate that idea.	Vince, Alonso, Bobby, Rebecca
1-17	Whole Class "Which is bigger, 2/3 or ¾?"	Comparing fractions	Focus is on both strategy sharing – they focus on Amelia's idea, Maggie comments to that effect – and representation. Note: Could be worthy of analysis, should look before and after the transcribed portion if I use this.	Amariah and Amelia are the presenters, and they get positively positioned. Bobby, Maggie, Sam S., Iris and more ask questions of them.
1-19	Calvin SG homework	Comparing fractions	This is a disagreement about a problem about ordering fractions – basically answer to homework, but doesn't go on and address the mathematics	Both Calvin and Sam S, though overall contribution is limited

1-24	Andrea & Rose SG	Fraction equivalence	Andrea is telling Rose what to do, but also making a point about fraction equivalence. Rose has asked for help here	Andrea dominates, typical for this dynamic, but Rose participates
1-25	Alonso & Tim SG, game	Comparing fractions	Alonso and Tim are playing a math game and engage over comparing fractions. Alonso figures out where to place 1/5 on a number line and explains it, then they do the same for 2/5. One of the few instances of engaging with a math game – lots of reasoning here.	Both Alonso and Tim
1-29	Whole Class Sam S. Strategy	Comparing fractions	Sam S. shares his strategy for comparing 1/3 and 3/10, which is essentially to multiply both by 3. Kids repeat and explain his ideas. (Another open strategy share)	Mostly Sam S.
1-30	Whole Class Fraction Mountains	Placing fractions on a number line, fractions in relationship to one another	Students create a "Fraction Track" game board, which involves spacing out 4ths, 5ths, etc. on a number line. Students then brainstorm what they notice about the number lines, such as that 10^{th} are much smaller than 3rds	Mix but Bobby, Vince, Rebecca, and Cassie all get up to the board.
2-2	Whole Class Iris & Haley Presentation	Comparing fractions, fraction equivalence, operations with fractions	Students show different strategies for solving the problem of the week, which involves comparing and adding fractions. Iris explains how she used fraction equivalence, and Cassie uses a different strategy. Amariah shows how she got C, which Haley disagrees with	Calvin, Iris, Haley, Cassie, Amariah all share at the board
2-5	Whole Class	Operations with	Amelia explains how she	Amelia, Bobby,

	3½ - 1¾	fractions, mixed numbers	solves the problem, and others comment, which gets them into negative fractions etc.	Haley
2-12	Bobby/Dan SG Tupelo	Fraction equivalence	Bobby and Dan work through Tupelo together, disagree on things as they work – gets to equivalence	Bobby, Dan
2-12	Whole Class Tupelo Discussion	Fraction equivalence	Quick tupelo share focused on Least Common denominator – Ms. Kanzer has Andrew share his work on that	Andrew
2-13	Calvin/Rebecca SG Tupelo	Fraction equivalence	Answer swap, with Calvin prompting Rebecca through it	Calvin, Rebecca
2-12	Bobby/Dan SG Tupelo	Fraction equivalence	Bobby and Dan work through Tupelo together, disagree on things as they work – gets to equivalence	Bobby, Dan
2-14	Whole Class analyzing Calvin's work	Multiplication of fractions by whole numbers	This is a critique of Calvin's representation of how he solved part of the bicycle race problem	Calvin
2-15	Whole Class estimating	Multiplication of fractions by whole numbers	Strategy shares with responses of how kids estimated 5 x 7/8 (not a bad prospect	Alonso, Maggie

APPENDIX L

Analysis of Opportunities to Learn Content in Each Literacy Discussion

Table 18. Analysis of opportunities to learn content in each literacy discussion

Date	Title	Literacy Content Discussed	What happened in this discussion? What was the literary focus?	Who did the intellectual work?
1-18 Writing	Whole Class Elements of a Literary Essay	Characteristics of an opinion essay, differences between literary essay and persuasive essay	After reading the story *Eleven* and a literary essay about that story, the students develop ideas about the differences between a persuasive essay and a literary essay. Students debate.	Tara, Andrew, Vince, Haley, Cassie, Ms. Kanzer
1-18 Writing	Bobby & Sorah SG *Eleven*	Characteristics of an opinion essay, differences between literary essay and persuasive essay	Bobby and Sorah share their ideas how literary and persuasive essays are different. They add on to each other's ideas to figure out the differences between the two.	Sorah in large part, Bobby somewhat
1-18 Writing	Tara & Dan SG *Eleven*	Literary analysis including analysis of characters and their motivations supported by textual evidence, Characteristics of a literary essay	Tara and Dan discuss *Eleven* and the essay written about it, developing ideas about the author of the literary essay's main message	Tara and Dan
1-19 Writing	Whole Group, Bobby & Gio on Persuasive vs. Literary Essays	Characteristics of an opinion essay, differences between literary essay and persuasive essay	Bobby and Gio give ideas on what they notice about another literary essay: *Fly Away Home*. They contrast this with a	Bobby, Gio, Vince, Ms. Kanzer

			literary essay	
1-19 Reading	Small Group, Bobby & Sorah	Character analysis, including their feelings, traits, and motivations	After Ms. Kanzer comes in to assist them, Bobby and Sorah read their post-it notes and respond to what each other wrote. Bobby asks about how Bud got his name, and Sorah wonders if Bud didn't actually see blood in the shed. They engage on both of these topics.	Sorah, Bobby, Ms. Kanzer when she helps them work together
1-25 Reading	Andrea SG First Five	Character analysis, including their feelings, traits, and motivations	Andrea and Sam S. offer ideas about the characters from the sticky notes they've written for homework. Andrea leads the conversation, describing how Bud is vulnerable and how she feels bad for him.	Andrea, Sam S,
1-25 Reading	Calvin & Alonso SG First Five	Character analysis, including their feelings, traits, and motivations	Calvin and Alonso discuss Bud's rules for survival, why he uses the term "Yes mama" so often, and why late people didn't get food.	Alonso, Calvin
1-25 Reading	Calvin & Rebecca SG Is this worthy? Delete?	Using evidence and quoting from the text to respond to questions about a text	Calvin and Rebecca answer a series of reading response questions together. Calvin mostly reads the questions, and Rebecca answers them	Calvin, Rebecca
1-25	Whole Class	Using evidence and	Amariah puts her	Amariah,

Reading	Reading Response	quoting from the text to respond to questions about a text	reading response on the board, and students discuss whether her response answers the question "What does Bud's name mean to his mom?"	Gio, Maggie
1-29 Reading	Gio & Randy SG Bud's Name	Character analysis, including their feelings, traits, and motivations	Gio, Randy and Tim debate whether Bud likes his name. Randy and Gio disagree, and they go back to the text to support their points.	Randy, Gio, Tim
1-31 Reading	Bobby SG Chapter Titles	Synthesis/retelling/main idea - titling chapters is essentially an exercise for working on this	Bobby and his small group members discuss an assignment given by Ms. Kanzer – what the title should be for each chapter. They debate mostly about Chapter 1, which Bobby wants to call "The Dreaded" and other kids don't.	Bobby, Sorah, Haley, Andrew
1-31 Reading	Calvin SG Chapter Titles	Synthesis/retelling/main idea - titling chapters is essentially an exercise for working on this	Students offer ideas for chapter titles, and students disagree and agree with different ones of them. Students do not provide much reasoning to support their ideas.	Rebecca, Oscar S, Tara, Calvin
2-1 Reading	Whole Class Bud Discussion Part 1	Determining the meaning of unknown phrases and words based on context clues	A chapter of *Bud Not Buddy* that students read the previous night is playing aloud. Vince raises his hand to ask what the meaning of Aww shucks is and	Randy for his thinking, and Alonso and Vince for their questions.

			students help him, and Alonso asks why Bud can't just wait in line like other kids.	
2-1 Reading	Whole Class Bud Discussion Part 2	Determining the meaning of words and phrases including those that are used figuratively	Bobby shares a sticky note where he notices that the phrases "Here we go again" and "Uh-oh" are repeated again and again in the book, and this might be a sign of trouble. This leads to a discussion of the importance of noticing repetition.	Bobby and Ms. Kanzer mostly – also Randy and Gio
2-1 Writing	Calvin & Rebecca SG Part 2	Evidence: what counts as evidence, whether they have evidence to answer the question at hand	Calvin and Rebecca are answering the question "What is Bud's Mom trying to say when she says 'When one door opens another one closes.' Rebecca proposes an answer but Calvin contests her answer because of a lack of evidence. The students end up answering the question on their own.	Calvin, Rebecca
2-2 Reading	Whole Class Door Opening Discussion	Analysis of figurative language including metaphor	The students are listening to *Bud Not Buddy* and they hear the phrase "When one door closes another door opens," like the previous day. Kids offer ideas about what they think it means, and they start discussing	Ms. Kanzer, Vince, Oscar S., Haley, Andrew

			whether a door closing is necessarily a bad thing.	
2-13 Reading	Whole Class *Bud* Blood Guy Discussion	Character analysis, including motivations and feelings; prediction	Students share sticky notes about *Bud Not Buddy* on a few different topics: whether Bud is overreacting to someone by thinking he could be a vampire, why Bud introduces himself as Bud not Buddy, and whether Bud will find his father in Grand Rapids. Students respond to each comment.	Rose, Amariah, Andrew, Haley, Alonso
2-13 Reading	Whole Class *Bud* Rules Discussion	Character analysis, including text-based interpretations	Students offer a rule from *Bud not Buddy*, and an interpretation of what that rule says about Bud. Students respond to their peers' interpretations.	Vince, Bobby, Tara, Andrew
2-14 Reading	Whole Class Accountable talk intro	Determining the meaning of unknown words using suffixes and root words; extending conversation about books	Ms. Kanzer introduces the term "Accountable Talk" and students dissect the word "accountable" and talk about what it means before Ms. Kanzer introduces a number of sentence stems for students to use.	Vince, Haley, Calvin
2-14 Reading	Tara/Dan SG accountable talk	Character analysis, including inferences about characters and their traits	Tara and Dan discuss reading response questions including "How does Bud react to the country?" and	Tara, Dan

			"What does Bud hope to gain by lying about where he's going?" Tara and Dan agree that Bud lies more than he needs to, and come to the conclusion that he's paranoid about even the smallest of danger because he's on his own and on the run.	
2-14 Reading	Calvin/Rebecca SG accountable talk	Character analysis, including inferences about characters and their traits	Calvin and Rebecca discuss reading response questions including "How does Bud react to the country?" and "What does Bud hope to gain by lying about where he's going?" Their answers are briefer than Tara and Dan's – they move more quickly from one question to another	Calvin, Rebecca
2-14 Reading	Whole Class Why Bud is Scared	Character analysis, setting, authors point of view	Vince expresses confusion about why Bud is scared. Hannah answers that he's especially scared because it's so late at night. Ms. Kanzer turns the discussion to centering on how the author chooses to set the story at 2:00 to create that mood.	Vince, Hannah, Bobby, Ms. Kanzer

BIBLIOGRAPHY

Almasi, J. F. (1995). The nature of fourth graders' sociocognitive conflicts in peer-led and teacher-led discussions of literature. *Reading Research Quarterly*, 314-351.

Amit, M., & Fried, M. N. (2005). Authority and authority relations in mathematics education: A view from an 8th grade classroom. *Educational Studies in Mathematics*, *58*(2), 145-168.

Andersson, K. (2014). Deliberative teaching: Effects on student' democratic virtues. *Scandinavian Journal of Educational Research*, *59*(5), 604-62

Andrews, R., Torgerson, C., Low, G., & McGuinn, N. (2009). Teaching argument writing to 7‐to 14‐year‐olds: an international review of the evidence of successful practice. *Cambridge Journal of Education*, *39*(3), 291-310.

Applebee, A. N., Langer, J. A., Nystrand, M., & Gamoran, A. (2003). Discussion-based approaches to developing understanding: Classroom instruction and student performance in middle and high school english. *American Educational Research Journal*, *40*(3), 685-730

Aukerman, M. S. (2007). When reading it wrong is getting it right: Shared evaluation pedagogy among struggling fifth grade readers. *Research in the Teaching of English*, 56-103

Aukerman, M. (2013). Rereading comprehension pedagogies: Toward a dialogic teaching ethic that honors student sensemaking. *Dialogic Pedagogy*, *1*

Aukerman, M. (2016). *A randomized control trial of shared evaluation pedagogy: The near-term and long-term impact of dialogically organized reading instruction*, (Unpublished doctoral dissertation). University of California, Berkeley, CA.

Bakhtin, M. (1934). Discourse in the Novel. *Literary theory: An anthology*, *2*, 674-685.

Ball, D. L. (1993a). Moral and intellectual, personal and professional: Restitching practice. In M. Buchmann and R. E. Floden, *Detachment and Concern: Topics in the Philosophy of Teaching and Teacher Education*, 193-204. New York: Teachers College Press

Ball, D. L. (1993b). With an eye on the mathematical horizon: Dilemmas of teaching elementary school mathematics. *Elementary School Journal*, *93*(4), 373-397.

Beck, I. L., & McKeown, M. G. (2001). Text talk: Capturing the benefits of read-aloud experiences for young children. *The reading teacher*, *55*(1), 10-20.

Bell, C. V., & Pape, S. J. (2012). Scaffolding student' opportunities to learn mathematics through social interactions. *Mathematics Education Research Journal*, *24*(4), 423-445.

Bent, F. (2005). Social science that matters. *Foresight Europe*, *2*, 38-42.

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, *9*(2), 27-40

Boyd, M., & Rubin, D. (2002). Elaborated student talk in an elementary ESoL classroom. *Research in the Teaching of English, 36*, 495-530.

Boyd, M., & Rubin, D. (2006). How contingent questioning promotes extended student talk: A function of display questions. *Journal of Literacy Research*, *38*(2), 141-169.

Beck, I. L., McKeown, M. G., Sandora, C., Kucan, L., & Worthy, J. (1996). Questioning the author: A yearlong classroom implementation to engage students with text. *The Elementary School Journal*, *96*(4), 385-414.

Buchs, C., Butera, F., Mugny, G., & Darnon, C. (2004). Conflict elaboration and cognitive outcomes. *Theory into practice*, *43*(1), 23-30.

Cazden, C. B. (2001). Classroom discourse: the language of teaching and learning. Cambridge, MA: Heinemann.

Chapin, S. H., O'Connor, C., & Anderson, N. C. (2003). *Classroom discussions using math talk in elementary classrooms.* New York, NY: Math Solutions.

Chapin, S. H., & O'Connor, C. (2007). Academically productive talk: Supporting student' learning in mathematics. *The learning of mathematics*, 113-128.

Chapin, S. H., O'Connor, C., O'Connor, M. C., & Anderson, N. C. (2009). *Classroom discussions: Using math talk to help student learn, Grades K-6*. New York, NY: Math Solutions.

Chinn, C. A., Anderson, R. C., & Waggoner, M. A. (2001). Patterns of discourse in two kinds of literature discussion. *Reading Research Quarterly*, *36*(4), 378-411

Charmaz, K. (2014). *Constructing grounded theory*. Thousand Oaks, CA: Sage Publications.

Cobb, P. (1994). Where is the mind? Constructivist and sociocultural perspectives on mathematical development. *Educational Researcher*, *23*(7), 13-20

Cohen, D. K., Raudenbush, S. W., & Ball, D. L. (2003). Resources, instruction, and research. *Educational Evaluation and Policy Analysis*, *25*(2), 119-142.

Cohen, E. G. (1994) *Designing Groupwork: Strategies for the Heterogeneous*

Classroom. 2nd ed. New York: Teachers College Press

Cohen, E. G., & Lotan, R. A. (1995). Producing equal-status interaction in the heterogeneous classroom. *American Educational Research Journal*, *32*(1), 99-120

Collingwood, R. G. (1999). In W.H. Dray and W.J. van der Dussen. *The principles of history: and other writings in philosophy of history*. Writings published posthumously. United Kingdom: Clarendon Press.

Council of Chief State School Officers. (2010). Common core state standards. Washington, DC: National Governors Association Center for Best Practices, Council of Chief State School Officers. National/Governors

Dickson, L. E. (2005). Goldbach's Empirical Theorem: Every integer is a sum of two primes. *LE Dickson. History of the Theory of Numbers*, *1*(421-424), 39.

Elliott, S. N., & Bartlett, B. J. (2016). Opportunity to learn. *Oxford Handbooks Online.*

Emerson, R. M., Fretz, R. I., & Shaw, L. L. (2011). *Writing ethnographic fieldnotes*. City: University of Chicago Press.

Engle, R. A., Langer-Osuna, J. M., & McKinney de Royston, M. (2014). Toward a model of influence in persuasive discussions: Negotiating quality, authority, privilege, and access within a student-led argument. *Journal of the Learning Sciences*, *23*(2), 245-268

Englund, T. (2006). Deliberative communication: A pragmatist proposal. *Journal of Curriculum Studies*, *38*(5), 503-520

Englund, T. (2015). On moral education through deliberative communication. *Journal of Curriculum Studies*, *48*(1), 58-76

Erickson, F. (1986). Qualitative methods in research on teaching. In M. C. Wittrock

(Ed.), *Handbook of research on teaching* (3rd ed., pp. 119-161). New York: Macmillan.

Ernest, P. (1997). The legacy of Lakatos: Reconceptualising the philosophy of mathematics. *Philosophia Mathematica*, *5*(2), 116-134

Featherstone, H., Crespo, S., Jilk, L. M., Oslund, J. A., Parks, A. N., & Wood, M. B. (2011). Smarter together! Collaboration and equity in the elementary math classroom. *Reston, VA: National Council of Teachers of Mathematics*.

Fitchett, P. G., & Heafner, T. L. (2010). A national perspective on the effects of high-stakes testing and standardization on elementary social studies marginalization. *Theory & Research in Social Education*, *38*(1), 114-130.

Franke, M. L., Webb, N. M., Chan, A., Battey, D., Ing, M., Freund, D., & De, T. (2007). Eliciting student thinking in elementary school mathematics classrooms. Los Angeles, California: National Center for Research on Evaluation, Standards, and Student Testing Center for the Study of Evaluation.

Franke, M. L., Webb, N. M., Chan, A. G., Ing, M., Freund, D., & Battey, D. (2009). Teacher questioning to elicit student' mathematical thinking in elementary school classrooms. *Journal of Teacher Education*, *60*(4), 380-39

Fraivillig, J. L., Murphy, L. A., & Fuson, K. C. (1999). Advancing children's mathematical thinking in everyday mathematics classrooms. *Journal for research in mathematics education*, *30*(2), 148.

Franke, M. L., Turrou, A. C., Webb, N. M., Ing, M., Wong, J., Shin, N., & Fernandez, C. (2015). Student engagement with others' mathematical ideas: The role of teacher invitation and support moves. *The Elementary School Journal*, *116*(1), 126-148

Gage, N. L. (1989). The paradigm wars and their aftermath a "historical" sketch of

research on teaching since 1989. *Educational Researcher*, *18*(7), 4-10

Gee, J. P. (2001). Reading as situated language: A sociocognitive perspective. *Journal of Adolescent & Adult Literacy*, *44*(8), 714-725.

Gee, J. P. (2008). A sociocultural perspective on opportunity to learn. In P. A. Moss, D. C. Pullen, J. P. Gee, E. H. Haertel, & L. J. Young (Eds.), Assessment, equity, and opportunity to learn (pp. 76–108). New York: Cambridge University Press.

Gholson, M., & Martin, D. B. (2014). Smart Girls, Black Girls, Mean Girls, and Bullies: At the Intersection of Identities and the Mediating Role of Young Girls' Social Network in Mathematical Communities of Practice. *Journal of Education*, *194*(1).

Gilbert, J., & Graham, S. (2010). Teaching writing to elementary students in grades 4–6: A national survey. *The Elementary School Journal*, *110*(4), 494-518.

Gilbert, M. C. (2014). Using Productive Disposition to Differentiate Between Student's Level of Precision When Critiquing a Peer's Work. *School Science and Mathematics*, *114*(7), 339-348.

Goos, M. (2014). Creating opportunities to learn in mathematics education: a sociocultural perspective. *Mathematics Education Research Journal*, *26*(3), 439-457.

Green, J., Franquiz, M., & Dixon, C. (1997). The myth of the objective transcript: Transcribing as a situated act. *TESOL Quarterly*, *31*(1)

Gresalfi, M., Martin, T., Hand, V., & Greeno, J. (2009). Constructing competence: An analysis of student participation in the activity systems of mathematics classrooms. *Educational studies in mathematics*, *70*(1), 49-70

Gutmann, A. (1987). *Democratic education.* Princeton, N.J.: Princeton University Press.

Gutmann, A. and Thompson, D. (1996). *Democracy and disagreement.* Cambridge, MA:

Belknap Press.

Hatano, G. (1993). Time to merge Vygotskian and constructivist conceptions of knowledge acquisition. In E. A. Forman, N. Minick, & C. A. Stone (Eds.), *Contexts for learning: Sociocultural dynamics in student's development* (pp. 153-166). New York: Oxford University Press.

Herman, J. L., Klein, D. C., & Abedi, J. (2000). Assessing students' opportunity to learn: Teacher and student perspectives. *Educational Measurement: Issues and Practice*, *19*(4), 16-24.

Hess, D. E. (2009). *Controversy in the classroom: The democratic power of discussion*. City: Routledge.

Hess, D. E., & McAvoy, P. (2014). *The political classroom: Evidence and ethics in democratic education*. City: Routledge.

High-leverage practices. (2012). Retrieved from teachingworks.org/work-of-teaching/high-leverage-practices. Accessed August 10th, 2017.

Hogan, K., Natasi, B. K., & Pressley, M. (2000). Discourse patterns and collaborative scientific reasoning in peer and teacher-guided discussions. *Cognition and Instruction*, *14*(4), 378-432

Ing, M., Webb, N. M., Franke, M. L., Turrou, A. C., Wong, J., Shin, N., & Fernandez, C. H. (2015). Student participation in elementary mathematics classrooms: The missing link between teacher practices and student achievement? *Educational Studies in Mathematics*, *90*(3), 341-356.

Bobbys, V., Lamb, L., & Philipp, R. (2010). Professional noticing of student's mathematical thinking. *Journal for Research in Mathematics Education*, *41*(2), 169-202.

Bobbys, V. R., & Empson, S. B. (2015). Responding to student's mathematical thinking in the moment: An emerging framework of teaching moves. *ZDM*, *48*(1-2), 185-197.

Johnson, N. C. (2017). *Expanding Competence: Supporting Student to Engage with Each Other's Mathematical Ideas* (Unpublished doctoral dissertation, UCLA).

Kazemi, E., & Stipek, D. (2001). Promoting conceptual thinking in four upper-elementary mathematics classrooms. *The Elementary School Journal*, *102*(1), 59-80.

Kazemi, E., & Hintz, A. (2014). *Intentional talk: How to structure and lead productive mathematical discussions*. Stenhouse Publishers.

Knudson, R. E. (1992). The development of written argumentation: An analysis and comparison of argumentative writing at four grade levels. *Child Study Journal, 22*(3), 167-184.

Kuhn, D., & Crowell, A. (2011). Dialogic argumentation as a vehicle for developing young adolescents' thinking. *Psychological science*, *22*(4), 545-552.

Kurz, A. (2011). Access to what should be taught and will be tested: Students' opportunity to learn the intended curriculum. In *Handbook of accessible achievement tests for all students*(pp. 99-129). Springer, New York, NY.

Lampert, M. (1985). How do teachers manage to teach? Perspectives on problems in practice. *Harvard Educational Review*, *55*(2), 178-195.

Lampert, M. (2001). *Teaching problems and the problems of teaching*. New Haven: Yale University Press.

Langer-Osuna, J. M. (2011). How Brianna became bossy and Kofi came out smart:

Understanding the trajectories of identity and engagement for two group leaders in a project-based mathematics classroom. *Canadian Journal of Science, Mathematics and Technology Education*, *11*(3), 207-225.

Langer-Osuna, J. M. (2015). From getting "fired" to becoming a collaborator: A case of the co-construction of identity and engagement in a project-based mathematics classroom. *Journal of the Learning Sciences*, *24*(1), 53-92.

Langer-Osuna, J. M. (2016). The social construction of authority among peers and its implications for collaborative mathematics problem solving. *Mathematical Thinking and Learning*, *18*(2), 107-124.

Langer-Osuna, J. (2017). Authority, identity, and collaborative mathematics. *Journal for Research in Mathematics Education*, *48*(3), 237-247

Lave, J. (1991). Situating learning in communities of practice. *Perspectives on Socially Shared Cognition*, *2*, 63-82.

Luttrell, W. (2010). *Qualitative educational research: Readings in reflexive methodology and transformative practice.* New York: Routledge.

Maxwell, J. A. (2012). *Qualitative research design: An interactive approach.* Thousand Oaks, CA: Sage Publishing Co.

Mayes, E., Mitra, D., & Serriere, S. C. (2016). Figured worlds of citizenship: Examining differences made in "making a difference" in an elementary school classroom. *American Educational Research Journal*, *53*(3), 605-638.

McAvoy, P., & Hess, D. (2013). Classroom deliberation in an era of political polarization. *Curriculum Inquiry*, *43*(1), 14-47.

McCrone, S. (2005). The development of mathematical discussions: An investigation in a

fifth-grade classroom. *Mathematical Thinking and Learning*, *7*(2), 111-13.

Merriam, S. (1995). What can you tell from an N of 1?: Issues of validity and reliability in qualitative research. *PAACE Journal of Lifelong Learning*, *4*, 50-60.

Michaels, S., O'Connor, C., & Resnick, L. B. (2007). Deliberative discourse idealized and realized: Accountable talk in the classroom and in civic life. *Studies in Philosophy and Education*, *27*(4), 283-29.

Mitra, D. L., & Serriere, S. C. (2012). Student voice in elementary school reform: Examining youth development in fifth graders. *American Educational Research Journal*, *49*(4), 743-77.

National Council for the Social Studies. (2013). *College, Career, and Civic Life (C3) Framework for Social Studies State Standards: Guidance for Enhancing the Rigor of K-12 Civics, Economics, Geography, and History*. Silver Spring, MD: National Council for the Social Studies.

National Council of Teachers of Mathematics (NCTM). (2014). *Principles to actions: Ensuring mathematical success for all.* Research Brief on Discussion. Reston, VA: NCTM.

Nystrand, M., & Gamoran, A. (1997). The big picture: Language and learning in hundreds of english lessons. In *Opening dialogue: Understanding the dynamics of language and learning in the english classroom*

Nystrand, M., Gamoran, A., Kachur, R., & Prendergast, C. (1997). Opening dialogue: Understanding the dynamics of language and learning in the English classroom. New York, NY: Teachers College Press.

Nystrand, M. (2006). Research on the role of classroom discourse as it affects reading

comprehension. *Research in the Teaching of English*, 392-412.

O'Connor, M. C., & Michaels, S. (1996). Shifting participant frameworks: Orchestrating thinking practices in group discussion. *Discourse, learning, and schooling*, 63-103.

Pace, J. L. (2011). The complex and unequal impact of high stakes accountability on untested social studies. *Theory & Research in Social Education*, *39*(1), 32-60.

Paley, V. G. (1992). *You can't say you can't play*. City: Harvard University Press.

Palincsar, A. S. (1986). The role of dialogue in providing scaffolded instruction. *Educational Psychologist*, *21*(1-2), 73-98.

Parker, W. C., & Hess, D. (2001). Teaching with and for discussion. *Teaching and teacher education*, *17*(3), 273-289.

Parker, W. (2003). *Teaching democracy: Unity and diversity in public life* (Vol. 14). New York: Teachers College Press.

Parker, W. C. (2006). Public discourses in schools: Purposes, problems, possibilities. *Educational Researcher*, *35*(8), 11-18.

Parker, W. C. (2010). Listening to strangers: Classroom discussion in democratic education. *Teachers College Record*, *112*(11), 2815-283.

Patton, M. Q. (2015). Qualitative research and evaluation methods: Integrating theory and practice, 4th edition. Thousand Oaks, CA: Sage Publications

Peshkin, A. (1988). In search of subjectivity. One's own. *Educational Researcher*, *17*(7), 17-21.

Reisman, Abby, Hannah Schneider Kavanagh, Chauncey Monte-Sano, Brad Fogo, Hannah C.

McGrew, Peter Cipparone, and Elizabeth Simmons. "Facilitating whole-class discussions in history: A framework for preparing teacher candidates." *Journal of Teacher Education* 69, no. 3 (2018): 278-293.

Reisman, A., Kavanagh, S. S., Monte-Sano, C., Fogo, B., McGrew, S. C., Cipparone, P., & Simmons, E. (2018). Facilitating whole-class discussions in history: A framework for preparing teacher candidates. *Journal of Teacher Education*, *69*(3), 278-293.

Reisman, A., Cipparone, P., Monte-Sano, C., Kavanagh, S. S., McGrew, S., & Fogo, B. (2019). Evidence of emergent practice: Teacher candidates facilitating historical discussions in their field placements. *Teaching and teacher education*, *80*, 145.

Rosenberg, S. (2005). The empirical study of deliberative democracy: Setting a research agenda. *Acta Politica*, *40*(S2), 212-224.

Rosenhouse, J. (2009). *The Monty Hall problem: the remarkable story of Math's most contentious brain teaser*. Oxford University Press.

Schleppenbach, M., Perry, M., Miller, K. F., Sims, L., & Fang, G. (2007). The answer is only the beginning: Extended discourse in Chinese and US mathematics classrooms. *Journal of Educational Psychology*, *99*(2), 380.

Schmittau, J. (2005). The development of algebraic thinking: A Vygotskian perspective. *ZDM*, *37*(1).

Seidman, I. E. (1991). Establishing access to, making contact with, and selecting participants. *Interviewing As Qualitative Research: A Guide for Researchers in Education and the Social Sciences*, 31-45. Pages.

Sherry, M. B. (2014). Indirect challenges and provocative paraphrases: Using cultural

conflict-talk practices to promote student' dialogic participation in whole-class discussions. *Research in the Teaching of English*, *49*(2), 141.

Shreiner, T. L. (2014). Using historical knowledge to reason about contemporary political issues: An expert–novice study. *Cognition and Instruction*, *32*(4), 313-352.

Smith, L. T. (2014). Social justice, transformation and indigenous methodologies. In *Ethnographic worldviews* (pp. 15-20). Netherlands: Springer.

Spillane, J. P. (2000). A fifth-grade teacher's reconstruction of mathematics and literacy teaching: Exploring interactions among identity, learning, and subject matter. *The Elementary School Journal*, *100*(4), 307-330.

Stigler, J. (1988). Research into Practice: The Use of Verbal Explanation in Japanese and American Classrooms. *Arithmetic Teacher*, *36*(2), 27-29.

Toulmin, S. E. (1958). *The use of argument*. Cambridge University Press.

Tuyay, S., Jennings, L., & Dixon, C. (1995). Classroom discourse and opportunities to learn: An ethnographic study of knowledge construction in a bilingual third-grade classroom. *Discourse processes*, *19*(1), 75-110. – they describe what they mean by opportunities to learn in ways that I can borrow from

van Drie, J., & van Boxtel, C. (2007). Historical reasoning: Towards a framework for analyzing student' reasoning about the past. *Educational Psychology Review*, *20*(2), 87-110

Wagganer, E. L. (2015). Creating math talk communities. *Teaching Student Mathematics*, *22*(4), 248-254.

Walshaw, M., & Anthony, G. (2008). The teacher's role in classroom discourse: A

review of recent research into mathematics classrooms. *Review of educational research*, *78*(3), 516-551.

Webb, N. M., Franke, M. L., Ing, M., Wong, J., Fernandez, C. H., Shin, N., & Turrou, A. (2014). Engaging with others' mathematical ideas: Interrelationships among student participation, teachers' instructional practices, and learning. *International Journal of Educational Research*, *63*, 79-9.

Webb, N. M., Franke, M. L., Johnson, N. C., Turrou, A. C., & Ing, M. (2017). Dude, don't start without me!: Fostering engagement with others' mathematical ideas. In *Promoting Spontaneous Use of Learning and Reasoning Strategies* (pp. 292-309). Routledge.

Yackel, E., & Cobb, P. (1996). Sociomathematical norms, argumentation, and autonomy in mathematics. *Journal for Research in Mathematics Education*, *27*(4), 458-477.

Yin, R. K. (2004). *The case study anthology*. Thousand Oaks, CA: Sage Publishing Co.

Young, I. M. (2000). Inclusion and democracy. New York: Oxford University Press.